DENON

Hi-Fi Component

SERVICE MANUAL

MODEL DN-650F

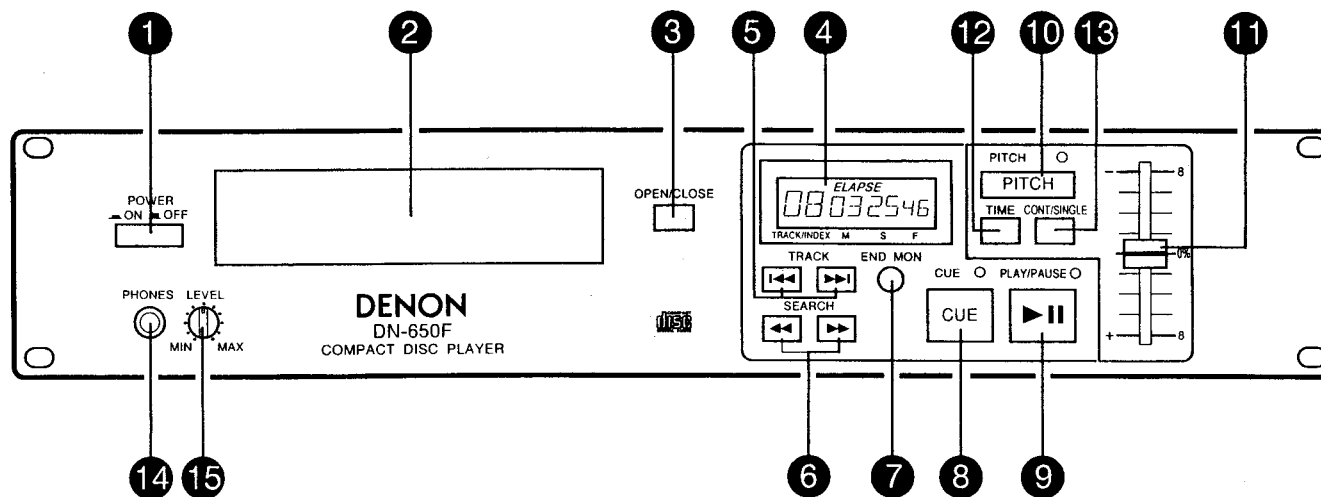## CD PLAYER

— TABLE OF CONTENTS —
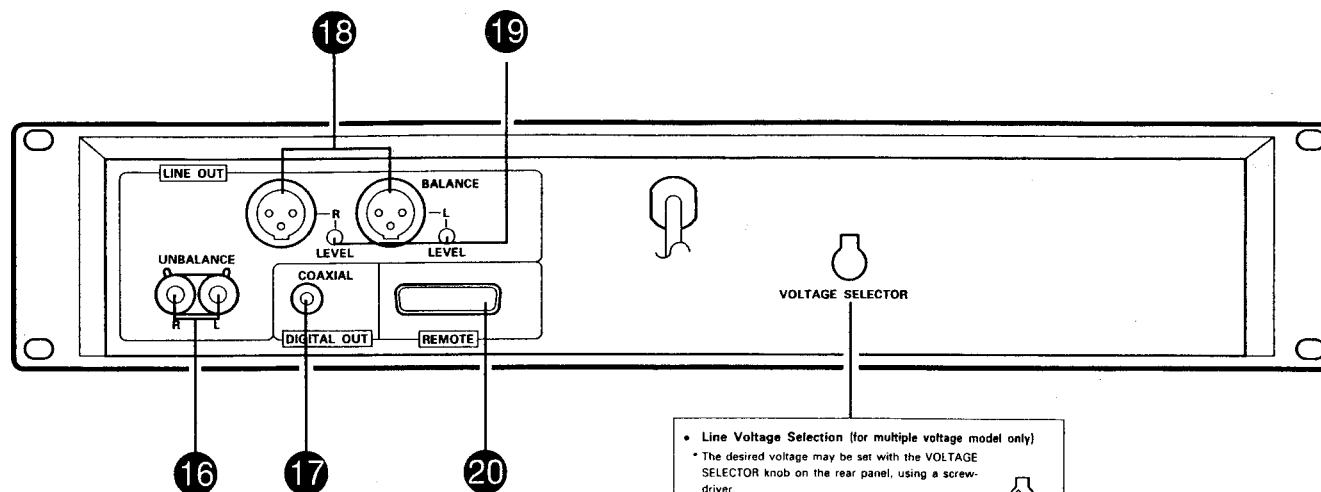
NIPPON COLUMBIA CO., LTD.

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FRONT PANEL
FRONTPLATTE
PANNEAU AVANT
PANEL FRONTAL
FRAMSIDA

REAR PANEL
RÜCKWAND
PANNEAU ARRIERE
PANEL TRASERO
BAKSIDA

- **Line Voltage Selection (for multiple voltage model only)**
  * The desired voltage may be set with the VOLTAGE SELECTOR knob on the rear panel, using a screwdriver.
  * Do not twist the VOLTAGE SELECTOR knob with excessive force as this may cause damage.
  * If the VOLTAGE SELECTOR knob does not turn smoothly, please contact a qualified serviceman.

VOLTAGE SELECTOR

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1 PREPARATION

(1) Names, Dimensions and Functions of the Parts
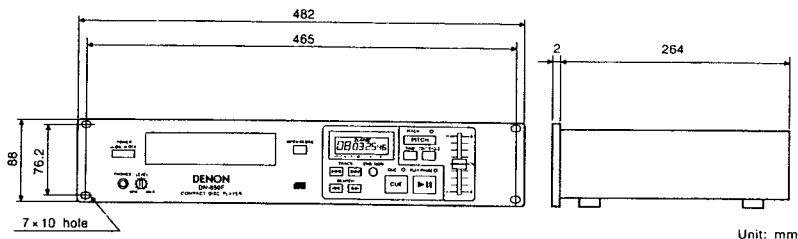

Unit: mm

Figure 1

1 POWER (Power Switch)
Switches the power of the unit.

2 Disc Holder
The disc is placed on this holder. Pressing the disc holder open/close button 3 will open and close the holder.
When loading the CD, place it securely in the disc holder.

3 OPEN/CLOSE (Disc Holder Open/Close Button)
Press to load or eject the disc. Each press will open or close the disc holder 2.

4 Time Display
This display shows the track or index number, time and elapsed or remaining time. Each frame represents 1/75 of a second.

5 TRACK (Track Button)
This button selects the track or index to be played.
Refet to Page 11, 15

6 SEARCH (Search Buttons)
These buttons are used to accurately change the positions where disc play will start.
Refet to Page 14

7 END MON (End Monitor Button)
This button is pressed during the standby mode to play the last section of the track.
Refet to Page 15

8 CUE (Cue Button)
Pressing the CUE button during play provides a return to the position at which play was started. Pressing the PLAY/PAUSE button and the CUE button alternatively allows the CD to be played from the same position any number of times. The red CUE LED will blink from the time the CUE button is pressed until the CD has reset to the position at which play was started. Steady lighting of this LED indicates the ready condition.
Refet to Page 13

9 PLAY/PAUSE (Play/Pause Button)
Each press of the PLAY/PAUSE button causes the operation to change from play to pause or from pause back to play.

10 PITCH (Pitch Button)
This button changes the play speed.
The pitch can be changed up to ±8% by pressing the PITCH button so the green PITCH LED blinks when moving the sliding fader.
When the playback speed is set to a value other than 0% with the preset function, the PITCH LED will light steadily to indicate that speed control is not possible from the pitch slider.
Refet to Page 14

11 Pitch Slider
Use this slider to adjust the playback speed. Slide up to decrease the speed, down to increase the speed.
Refet to Page 14

12 TIME (Time Button)
The TIME button switches the time display between elapsed time and remaining time. ELAPSE or REMAIN will be shown on the display.

13 CONT/SINGLE (Play Mode Button)
This is for switching the play mode between the single track mode (SINGLE) and continuous play mode (CONT.).
Refet to Page 11

14 PHONES (Headphones Jack)
Connect headphones with an impedance of 30 to 40 ohms.

15 Volume Control (PHONES LEVEL)
• Use this to adjust the output level of the headphones.

16 LINE OUT (Output Jacks)
• RCA Pin-jack, unbalanced.
The audio is output from these jacks.
Connect to the line input of the mixer.
Red is for the right channel and white the left channel.

17 DIGITAL OUT (Digital Output Jack)
• This jack outputs digital data.
• We recommended using a 75-ohm pin cord (available in stores) for connections.

18 LINE OUT L/R (Output Connectors)
1) These are active balanced type outputs using XLR type connectors.
Connect them to balanced type inputs with an impedance of 600 ohms on an amplifier or console.
2) Signal layout
Pin 1 : Common
Pin 2 : Cold
Pin 3 : Hot
3) Applicable connector: Cannon XLR-3-11C or the equivalent
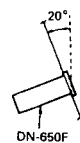**NOTE:** Do not short-circuit the hot or cold pin with the common pin.

19 LEVEL L/R (Output Level Controls)
These adjust the level of the audio signals output from the LINE OUT L/R 18 connectors.

20 REMOTE (Remote Control Connector)
1) This is a connector for parallel remote connection.
The player can be controlled remotely with a dry contact circuit connection.
2) Applicable connector: 25-pin D-sub plug
3) Signal layout
Refer to Page 19

Pin No.		Signal	I/O	Level
1		FG	–	
	14	PLAY TALLY	O	TTL (Iol=48 mA)
2		PLAY COMMAND	I	HCMOS (Ii=-3 mA)
	15	PAUSE TALLY	O	TTL (Iol=48 mA)
3		PAUSE COMMAND	I	HCMOS (Ii=-3 mA)
	16	CUE TALLY	O	TTL (Iol=48 mA)
4		CUE COMMAND	I	HCMOS (Ii=-3 mA)
	17	INDEX 2/3 TALLY	O	TTL (Iol=48 mA)
5		TRACK (+) COMMAND	I	HCMOS (Ii=-3 mA)
	18	NC	–	
6		TRACK (-) COMMAND	I	HCMOS (Ii=-3 mA)
	19	NC	–	
7		SEARCH (FWD) COMMAND	I	HCMOS (Ii=-3 mA)
	20	NC	–	
8		SEARCH (REV) COMMAND	I	HCMOS (Ii=-3 mA)
	21	NC	–	
9		FADER START	I	HCMOS (Ii=-3 mA)
	22	TALLY POWER SUPPLY	O	+5 V, 20 mA
10		COMMAND COMMON	–	
	23	COMMAND COMMON	–	
11		NC	–	
	24	E.O.M./INDEX 2/INDEX 3	O	DRY CONTACT
12		NC	–	
	25	E.O.M./INDEX 2/INDEX 3	O	DRY CONTACT
13		NC	–	

(2) Installation Precautions

The DN-650F will work normally when the player unit is mounted within 20 degrees off the vertical plane at the front panel. If the unit is tilted excessively, the disc may not be loaded or unloaded properly.
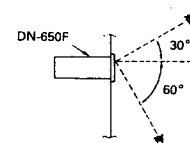
Figure 2

Install the DN-650F to a rack so as to maintain an appropriate visual angle to read the display as shown here.

Figure 3

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9

2 DESCRIPTION OF THE FUNCTIONS

The DN-650F is provided with special functions which are not available in common CD player. Please read the following explanation carefully before using these functions.

(1) Automatic Cueing

Automatic cuing automatically searches for sound levels which are above the preset cue detect level following track selection and sets the cue mode. This function can skip a blank portion at the beginning of a track. See Page 17.

(2) Instant Start/Delayed Start

The audio starts up within 0.01 seconds with a press of the play button. This provides an accurate start since there is no sound delay. A delayed start is also possible. The duration of the delay can be selected. See Page 17.

(3) Fade In

There will be a fade in of the sound over the selected duration when playback is started. See Page 18.

(4) EOM (End Of Message)

The EOM function causes the LCD to blink as an indication that the end of the playback is approaching when the remaining time of the playback reaches the preset time. Note that this unit may have a time deviation of 2 to 3 seconds duration. See Page 18.

(5) End Monitor

This function plays the end portion of a track. The length of playback can be selected. See Page 18.

(6) Single/Continuous Play Mode

Playback finishes at the end of the selected track in single play mode, whereas, playback continues to the end of the disc in continuous play mode. This function can be switched with the button or one of these modes can be preset after the power is switched on. See Page 11.

(7) Presetable Playback Speed

The playback speed can be fixed to a preset speed in the range of 0 to +3% of the regular speed. When the speed is preset to a speed other than 0%, speed adjustment is not possible with the pitch slider. At this time the PITCH LED will be lit steadily. See Page 18.
Even if the pitch slider is mistakenly moved, the preset speed will not change.

The unit also has a variety of other functions. Please carefully read Section 4 PRESET FUNCTIONS on Page 16, 17, 18 and select the desired functions.

3 OPERATION

(1) Loading and Ejecting the Disc
① Open the disc holder
When the disc holder is closed, press the OPEN/CLOSE button to open the disc holder.
② Place a disc in the disc holder

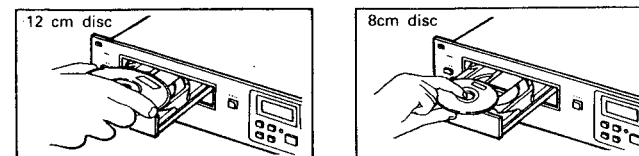Figure 4

③ Loading the disc
Press the OPEN/CLOSE button to close the disc holder.
• A press of the PLAY/PAUSE button will close the disc holder and start playback.
• When a track is selected while the disc holder is open, the unit will access the selected track.
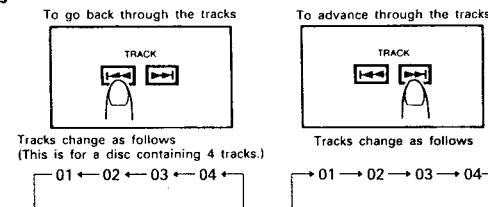
(2) Selecting Tracks

Figure 5

Each press of the TRACK button changes 1 track.
Continuing to hold the TRACK button down provides an automatic change at a higher speed which is convenient for discs that contain many tracks.
During the track selection operation, the track indication of the display will blink and the Minute, Second, Frame indication will be off.
When a new track is selected during play, after the selection operation is completed, play will immediately start from the beginning of the newly selected track.
The track number can be selected before loading a disc on DN-650F.
You can select a track to play, then load a disc. DN-650F will cue up to your selected track automatically.

(3) SINGLE/CONTINUE Play Mode Selection
• Press the CONT/SINGLE button to set DN-650F for SINGLE track playback mode, " 5 " is displayed on TRACK section.
During single playback mode, DN-650F stops after a specified track is played back.
• Press the CONT/SINGLE button to set DN-650F for continuous playback mode, " C " is displayed on TRACK section.
During continuous playback mode, DN-650F continue playback until completion of playback of the last track on the disc.

(4) Starting Playback

Pressing the PLAY/PAUSE button during the pause condition or after the completion of back cue will start disc play.
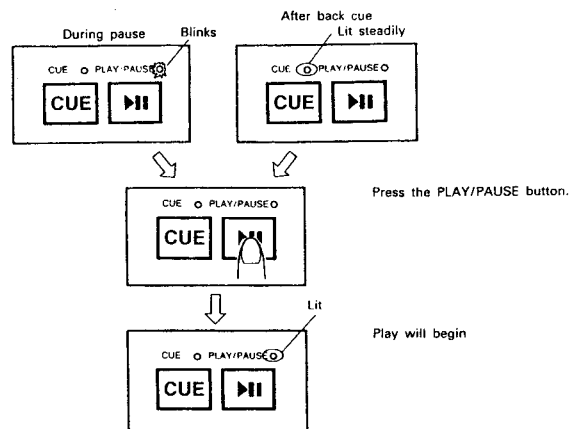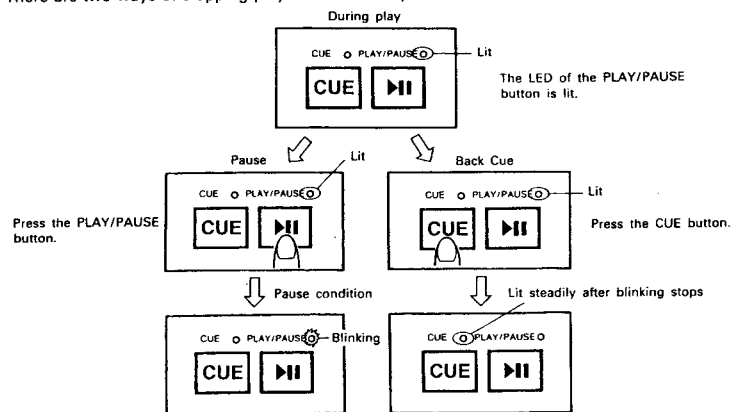

During pause — Blinks

After back cue — Lit steadily

Press the PLAY/PAUSE button.

Play will begin

Lit

Figure 6

(5) Stopping Playback

There are two ways of stopping play. One uses the pause function and the other the back cue function.

During play

The LED of the PLAY/PAUSE button is lit.

Pause — Lit   Back Cue — Lit

Press the PLAY/PAUSE button.   Press the CUE button.

Pause condition   Lit steadily after blinking stops

Blinking

The LED of the PLAY/PAUSE button blinks.
(The CD pauses at the position where the PLAY/PAUSE button was pressed during play.

Back cue operation.
First the LED of the CUE button blinks, then it lights steadily after the operation is completed.
(The CD returns to the position where play back started from.)

Figure 7

(6) Description of the PLAY/PAUSE, and CUE Operations

- Each press of the PLAY/PAUSE button causes the operation to change from play to pause or from pause back to play.
- The play operation of this CD player is performed via DSP (Digital Signal Processor) and memory, so the audio starts instantly after the PLAY/PAUSE button is pressed.
- Pressing the CUE button during disc play resets the CD to the position at which play was started. (This is called the back cue function.)

The steps through which disc play is performed when the PLAY/PAUSE and CUE buttons are pressed are described with the aid of the following illustrations in Figures 8 through 10.

① PLAY and PAUSE

Press the PLAY/PAUSE button   Press the PLAY/PAUSE button   Press the PLAY/PAUSE button   Position on the disc

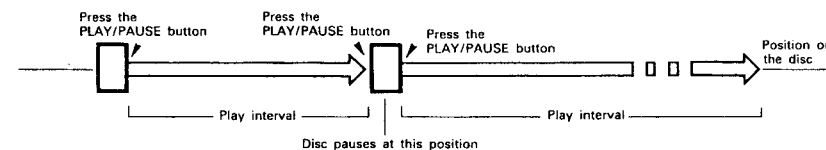Play interval   Play interval

Disc pauses at this position

Figure 8

Pressing the PLAY/PAUSE button starts the disc play (Operation progress is shown by the arrows of Figure 8). Pressing the PLAY/PAUSE button again during disc play causes the play operation to pause, and pressing this button once more causes the disc to be played again.

② PLAY and CUE

Press the PLAY/PAUSE button   Press the CUE button   Position on the disc

Play interval

Back cue operation
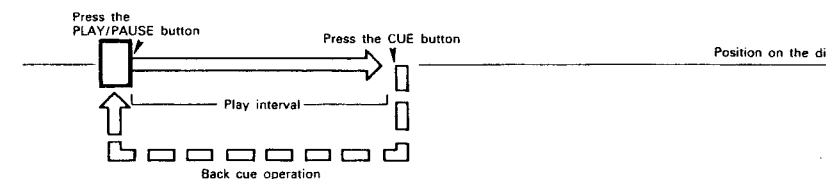
Figure 9

Pressing the PLAY/PAUSE button starts the disc play. Pressing the CUE button will reset the disc to the position where play was started. By alternately pressing the PLAY/PAUSE button and the CUE button, the disc may be played from the same position any number of times. This function is called back cue.

③ PLAY, PAUSE, and CUE

Press the PLAY/PAUSE button   Press the PLAY/PAUSE button   Press the PLAY/PAUSE button   Press the CUE button

Play interval   Play interval   Position on the disc

When play has been paused and is then started again, the return position with back cue will be updated.

Back cue operation

Figure 10

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DN-650F

(7) Adjusting the Speed
- Press the PITCH button to enable the speed to be adjusted with the pitch slider.
  The PITCH LED will blink to indicate that a pitch adjustment can be made.
- Pressing the PITCH button once again will light the PITCH LED and set that pitch.
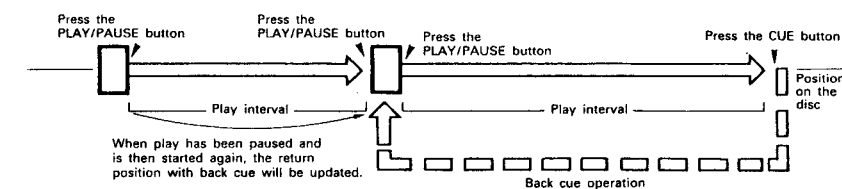- Pressing the PITCH button one further time will cause the PITCH LED turn off and the variable pitch function will switch off.
- Lowering the position of the pitch slider will increase the pitch and raising the position will decrease the pitch.
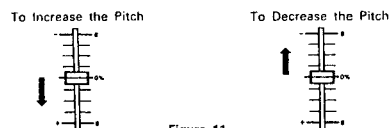
To Increase the Pitch   To Decrease the Pitch

Figure 11

Operation of the pitch slider will not change the speed when the preset playback speed is set to a value other than 0%.
NOTE: Be sure to set the PITCH button to the off condition when normal speed has been set.

(8) Searching
When a track is selected and the PLAY/PAUSE button is pressed, the play operation will start from the beginning of that track. However, when you want play to start from a different position, use the following procedure to find that position.
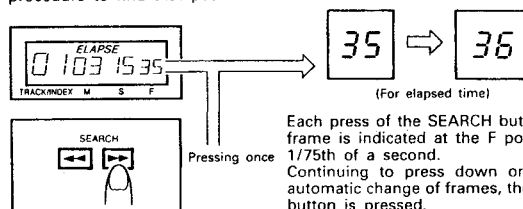
ELAPSE
0 103 1535
TRACK/INDEX M   S   F

35 ⇒ 36

(For elapsed time)

SEARCH

Pressing once

Figure 12

Each press of the SEARCH button causes 1 frame to change. (The frame is indicated at the F portion of the display.) Each frame is 1/75th of a second.
Continuing to press down on the SEARCH button provides an automatic change of frames, the speed of which increases while the button is pressed.
When the SEARCH button is pressed during playback, normal playback resumes after the button is released.

(9) Checking the Play Start Position
After selecting the track or after changing the play start position with the SEARCH button, use the following procedure to repeatedly check the position at which play will start.
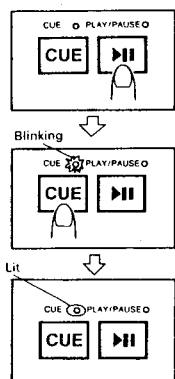
CUE   o PLAY/PAUSE o
CUE ►II

Blinking

CUE PLAY/PAUSE o
CUE ►II

Lit

CUE PLAY/PAUSE o
CUE ►II

Figure 13

Press the PLAY/PAUSE button.
Check that play will start from the desired position.
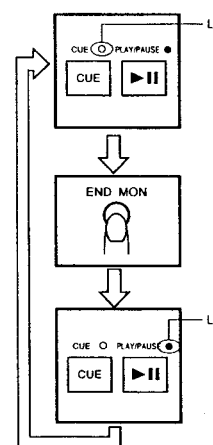
NOTE:
Once you have set up a new start position within a track, do not press the PLAY/PAUSE or SEARCH buttons. Pressing these buttons will change your start position.

Press the CUE button after checking the start position.
The player will return to the position where play was started.
When the CUE LED stops blinking, it is ready to start again.

If the play start position is not to your liking, use the search function to change the position.

(10) End Monitor
The end section of a track can be played at the touch of a button.
This function comes in very handy to check how the track ends.

CUE PLAY/PAUSE
CUE ►II
— Lit

In the CUE mode
The CUE button is lit.

END MON

Press the END MON button.

CUE O PLAY/PAUSE
CUE ►II
— Lit

The end of the track at which the CUE mode is set is played.
Playing time: 0 to 35 seconds in 5-second steps can be presetting. (Refer to on page 18)

Standby
position   Press the END MON button   End of track

End monitor interval

Play interval

When playback ends, the pickup returns and the standby mode is set.
Figure 14
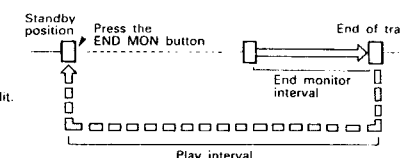
(11) Ending Playback
The operation that follows the playing of the disc to the end of the track in the single play mode, or follows the playing of the disc to the end in the continuous play mode can be selected from among the following three operations. See page 17.
① Recue
   The player returns to the playback start position and the cue mode is set.
② Next track
   The player moves to the next track and the cue mode is set.
③ Stop
   The PLAY/PAUSE LED blinks, the time display turns off, and the player stops.
   While the player is stopped, only the TRACK +/− button and the OPEN/CLOSE button are effective.

(12) Selecting Indexes
When the preset index search is set to on, the index number is displayed as TRACK/INDEX and the index can be selected with the TRACK +/− button. The operation procedure is the same as that in Section (2) Selecting Tracks.

Note:
Track selection is not possible when the preset index search is set to on. To select a track, reset the index search to off.

[4] PRESET FUNCTIONS

The DN-650F is equipped with non-volatile memory and is able to store various preset data. These data will not be lost even if the power is cut and so the desired settings corresponding to items such as those described in the table of Page 17, 18 can be stored to memory. Please use this function and operate the player at the optimum settings.

(1) Starting the Preset Data Change Mode
- Open the disc holder.
- Press the TIME button and the CONT./SINGLE button at the same time. The DN-650F will enter the preset data change mode and the first preset data will be displayed. The preset item number is displayed in the track display area and the current data are displayed in the minutes and seconds display area.
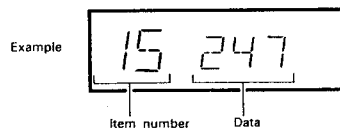
Example

Item number   Data

Figure 15

(2) Selecting the Item Number
- Press the TRACK + button to increase the item number.
- Press the TRACK − button to decrease the item number.
- The data of the selected item are displayed.

(3) Changing the Preset Data
- Press the SEARCH +/− button to select the preset data. The display data will change and blink.
- When the appropriate data have been selected, press the CUE button and store the data to the non-volatile memory.
  The display data will stop blinking.
- To change other items, repeat the operations of Steps (2) and (3).

(4) Initializing the Preset Data
- To initialize the preset data to the factory setting, store 1 to the data of item 0.
- The factory setting data are indicated by asterisks in the table of Page 17, 18.

(5) Exiting the Preset Data Change Mode
To complete the change and return to the normal mode, press the TIME button and the CONT./SINGLE button at the same time or press the OPEN/CLOSE button.

(6) Table of Preset Functions

The "*" mark indicates setting upon shipment from the factory.

ITEM	TRACK	MINUTE	SECOND		DESCRIPTION
Initialize	0	0		0	Non	* No operation
				1	Initial	Initialize to the same data as the factory setting.
Stereo/Mono	0	1		0	Stereo	* L/R stereo signal output.
				1	Mono	L/R signal output mixed.
Frame Display	0	2		0	Off	Frame is not displayed during playback.
				1	On	* Frame is displayed during playback.
Display Mode when Power Turned On	0	3		0	Elapse	* Elapsed time is displayed when power turned on.
				1	Remain	Remaining time is displayed when power turned on.
Play Mode when Power Turned On	0	4		0	Single	* Playback ends at the end of track.
				1	Continue	Playback continues until the end of disc.
Play Lock	0	5		0	Off	* All button functions during playback.
				1	On	Buttons except the TIME, CONT./SINGLE, PLAY/PAUSE don't function during playback.
Digital Out	0	6		0	With subcode	Digital signal outputs with subcode ... ①
				1	Without subcode*	Digital signal outputs without subcode ... ②
Index Search	0	7		0	Off	* Track, Minute, Second, Frame are displayed. Track is selected with TRACK buttons.
				1	On	Index, Minute, Second, Frame are displayed. Index is selected with TRACK buttons.
Tally Flash	0	8		0	No Flash	The PLAY, PAUSE, and CUE tallies in the REMOTE connector will remain off instead of blinking.
				1	Flash	* The PLAY, PAUSE, and CUE tallies in the REMOTE connector will blink when the corresponding LEDs of front panel blink.
Index 2/3	0	9		2	Index 2	Index 2 tally output from REMOTE connector pin 17.
				3	Index 3	* Index 3 tally output from REMOTE connector pin 17.
EOM/Index	1	0		1	EOM	* EOM Tally output from REMOTE connector pins 24 and 25.
				2	Index 2	Index 2 Tally output from REMOTE connector pins 24 and 25.
				3	Index 3	Index 3 Tally output from REMOTE connector pins 24 and 25.
Fader Start Mode	1	1		0	Start Only	Player starts when fader switch turned on.
				1	Start, Stop	* Player starts when fader switch turned on, set to pause mode when fader switch turned off.
Ending Playback	1	2		0	Recue	* When playback ends, player returns to the started position.
				1	Next Track	When playback ends, cue mode is set at the next track.
				2	Stop	Stop mode is set when playback ends.
Delay Start	1	3		0 0	0msec	* Audio start will be delayed by the selected time setting.
			1	0 0	100msec	
			2	0 0	200msec	
			3	0 0	300msec	
Cue Detect Level	1	4		− −	−∞	
				− 7 2	−72dB	
				− 6 6	−66dB	
				− 6 0	−60dB	* In the cue operation following track selection, audio signals above the set level are automatically searched and cued at that point.
				− 5 4	−54dB	
				− 4 8	−48dB	
				− 4 2	−42dB	
				− 3 6	−36dB	

① Data other than audio data such as sub codes will be output with regular values, but the cue detect level and the fade in duration will not be the preset values, rather −∞ and 0 ms, respectively. Also, the audio start time will be 300 ms or less.

② The cue detect level and the fade in duration will be the preset values. Data other than audio data such as sub codes will all be "0".

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ITEM	DISPLAY			DESCRIPTION
	TRACK	MINUTE	SECOND	
Fade In Duration	1	5	0	0msec * No fade in
			1 0	10msec
			3 0	30msec
			5 3	53msec
			1 0 6	106msec — The fade in operation of the selected duration is performed at the start of playback.
			1 4 8	148msec
			1 8 5	185msec
			2 4 7	247msec
EOM Duration	1	6	0	0sec — EOM not output
			5	5sec
			1 0	10sec * — EOM (end of message) starts when the remaining time becomes shorter than this duration. The LCD blinks and the EOM tally is output.
			1 5	15sec
			2 0	20sec
			2 5	25sec
			3 0	30sec
			3 5	35sec
End Monitor Duration	1	7	0	0sec — End Monitor does not function
			5	5sec
			1 0	10sec * — The selected duration at the end of the track is played back.
			1 5	15sec
			2 0	20sec
			2 5	25sec
			3 0	30sec
			3 5	35sec
Preset Playback Speed	1	8	0	Standard * — Speed adjustment is possible from the front panel
			2	+0.2%
			4	+0.4%
			6	+0.6%
			8	+0.8%
			1 0	+1.0% — The playback speed is fixed at the selected value and adjustment from the front panel is prohibited.
			1 2	+1.2%
			1 4	+1.4%
			1 6	+1.6%
			1 8	+1.8%
			2 0	+2.0%
			2 2	+2.2%
			2 4	+2.4%
			2 6	+2.6%
			2 8	+2.8%
			3 0	+3.0%

5 REMOTE CONTROL CONNECTIONS

To control the DN-650F remotely, refer to the example of remote control connections given below.
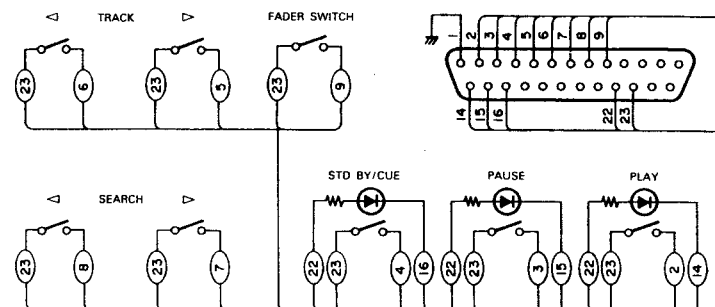

Figure 16

The rating of REMOTE connector pin 22 (TALLY POWER SUPPLY) is +5 V, 20 mA maximum. Avoid currents in excess of the rating.

6 BEFORE SWITCHING OFF THE POWER

When you have finished using the CD player, before switching off the power be sure that the disc holder has been closed with the OPEN/CLOSE button.

CAUTION:
Do not forcibly close the disc holder when the power is off.
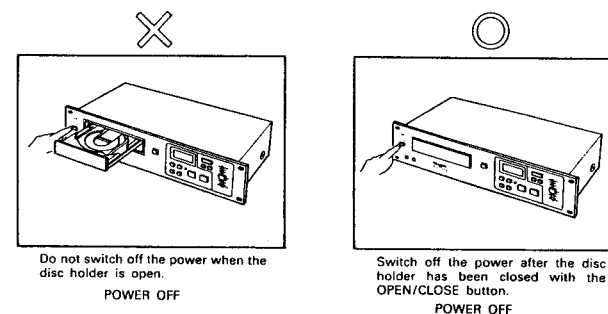It may damage the unit when it is transported.

Do not switch off the power when the disc holder is open.
POWER OFF

Switch off the power after the disc holder has been closed with the OPEN/CLOSE button.
POWER OFF

Figure 17

7 COMPACT DISCS

1. Precautions on handling compact discs
- Do not allow fingerprints, oil or dust to get on the surface of the disc.
  If the disc is dirty, wipe it off with a soft dry cloth.
- Do not use benzene, thinner, water, record spray, electrostatic-proof chemicals, or silicone-treated cloths to clean discs.
- Always handle discs carefully to prevent damaging the surface; in particular when removing a disc from its case or returning it.
- Do not bend the disc.
- Do not apply heat.
- Do not enlarge the hole in the center of the disc.
- Do not write on the label (printed side) with a hard-tipped implement such as a pencil or ball point pen.
- Condensation will form if a disc is brought into a warm area from a colder one, such as outdoors in winter. Do not attempt to dry the disc with a hair dryer, etc.

2. Precaution on storage
- After playing a disc, always unload it from the player.
- Always store the disc in the jewel case to protect from dirt or damage.
- Do not place discs in the following areas:
  1) Areas exposed to direct sunlight for a considerable time.
  2) Areas subject to accumulation of dust or high humidity.
  3) Areas affected by heat from indoor heaters, etc.

8 TROUBLESHOOTING

When you think the player might be broken, please check the following items.
The disc holder does not open or close.
- Is the power switch set to ON?
- Is the player in the process of playing a disc? ....

The display still indicates "−" when a disc is loaded.
- Is the disc loaded properly?
- Is the disc dirty or scratched?

There is no sound or the sound is distorted.
- Are the output cables connected to the amplifier correctly?
- Is the adjustment of the amplifier's controls and switching correct?

The specified portion of the disc cannot be played back correctly.
- Is the disc dirty or scratched?

There is a button that doesn't function.
- Has a preset such as PLAY-LOCK been set? ....

9 SPECIFICATIONS

GENERAL

Type	CD Player
Disc Type	Standard Compact Discs (12cm, 8cm/5", 3")

AUDIO SECTION

Channels	2 Channels Stereo
Sampling Frequency	44.1kHz at Normal Pitch
Quantization	16-bit Linear/Channel
Oversampling	8-times, 18-bit
Frequency Response	20Hz – 20kHz
Total Harmonic Distortion	0.008% or less
Signal to Noise Ratio	95dB or more
Channel Separation	90dB or more
Unbalanced Output	RCA Jack
Output level	2.0V at 0dB Disc
Load Impedance	10k ohm or more
Balanced Output	3-Pin XLR (Active Balanced)
Output Level	+18dBm at 0dB Disc (Active Balanced)
Output Adjust Range	+18dBm to −20dBm or more
Load Impedance	600 ohm
Digital Output	Coaxial (RCA Jack)
Headphone Output	Stereo
Output level	20mW or more
Load Impedance	30 to 40 ohm
Variable Pitch Controll	±8% max
Audio Start-up Time	0.01 second or less
Frame Search Accuracy	1/75 second

DIMENSIONS	482 (W) × 88 (H) × 266 (D) mm
	19" (W) × 3-15/32" (H) × 10-15/32" (D)
	excluding height of keys, connectors and foots
WEIGHT	Approx. 4.5kg
POWER CONSUMPTION	Approx. 14W
POWER SUPPLY	AC120V ±10%, 60Hz (USA, Canada)
	AC230V ± 10%, 50Hz (Europe, Others)
	AC115/230V ±10%, 50/60Hz (Asia, Others)
SAFETY STANDARD	UL (USA)
	CSA (Canada)

ENVIRONMENTAL CONDITIONS

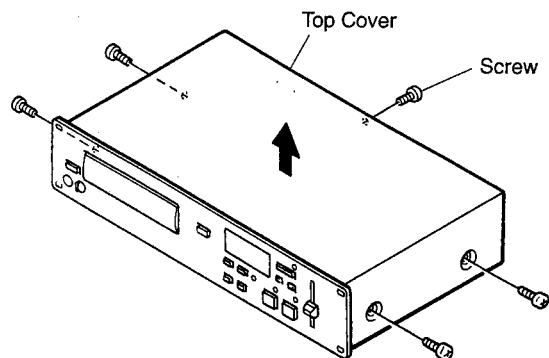|	
Operating Temperature	+5°C to 35°C
Humidity	25% to 85%, Non Condensing
Storage Temperature	−20°C to 60°C

REMOTE	Parallel Remote, D-sub 25 pin connector

* Specifications and design are subject to change without notice for purpose of improvement.
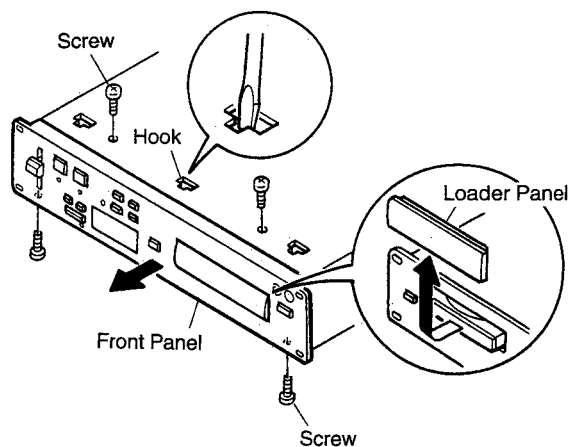
DISASSEMBLY

● TOP COVER

Remove 4 screws from both sides and 1 screw from Back Panel.

Top Cover

Screw

● FRONT PANEL

1. Pull Loader Frame frontward, and remove Loader Panel.
2. Remove 2 Front Panel upper screws.
3. Remove 2 Front Panel lower screws.
4. Undo 2 front panel upper hooks.
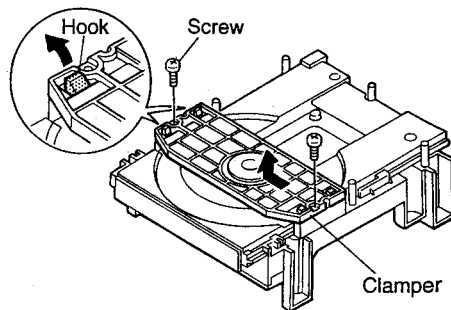5. Pull Front Panel and undo a lower hook.

Screw

Hook

Loader Panel

Front Panel

Screw

● MECHANISM UNIT

Remove 4 screws.

Screw

Mechanism Unit
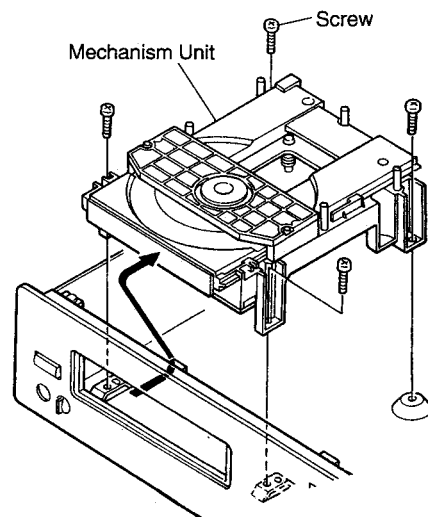
● CLAMPER

Remove 2 screws.
Pull clamper and undo 4 hooks.

Hook   Screw

Clamper

NOTE FOR HANDLING OF LASER PICK-UP

DESCRIPTION OF THE COMPONENTS

+Z-axis direction

+X-axis direction
Object lens
Double axes cover
OP Slide base
Slide rack
LO2 Flexible board
Label
+Y-axis direction
Z-axis
Flexible flat cable connector
Y-axis
(Tangential direction)
X-axis
(Radial direction)

LABEL

KSS240A
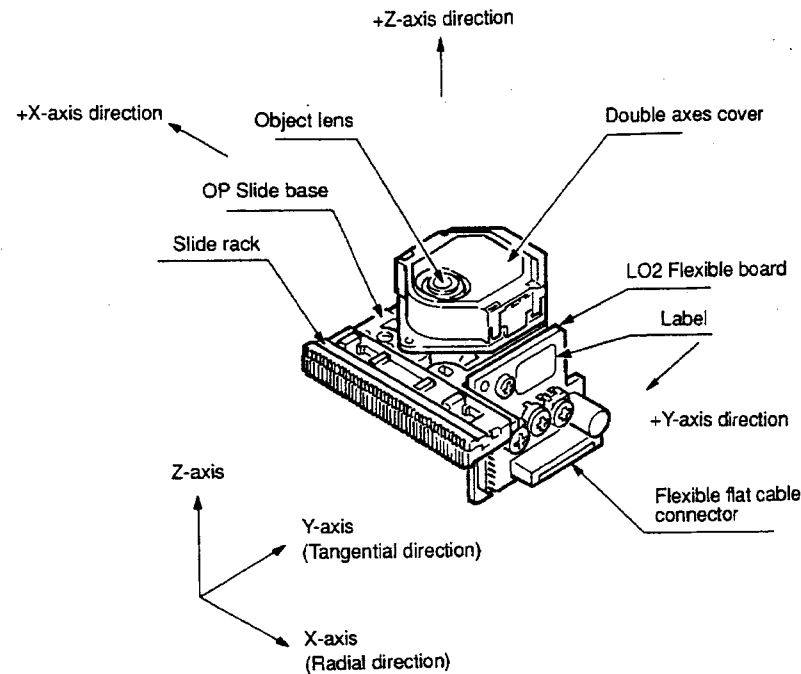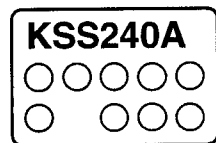
○○○○○ —— Lot No.
○ ○○○ —— Iop

year
(last figure)

day   month | quality control No.
○○   ○   ○   ○

but Oct. Nov. and Dec. are expressed by alphabetical letters of X, Y and Z.

10   1 10^1
○   ○   ○   ○

quality control   LD drive current

The expressed unit is by mA, with omission of the decimal point as for example, 56.5mA will be expressed as 565, but the head of English letter means the control in the manufacturning plant.

PIN CONNECTOR

KSS-240A

1 3 5 7 9 11
2 4 6 8 10 12
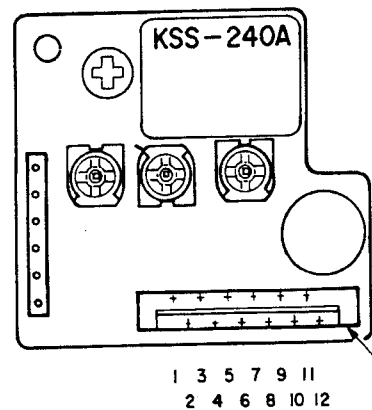
Flexible flat cable connector

Pin No.	Description	Input/Output	Pin No.	Description	Input/Output
1	VC (+2.5V)	OUT	7	Vcc (+5V)	IN
2	TE (TRK ER signal)	OUT	8	LDC (LD Control)	IN
3	FE (FCS ER signal)	OUT	9	FCS+ (Double axes)	IN
4	FZC (FZC signal)	OUT	10	TRK+ (Double axes)	IN
5	RF (RF signal)	OUT	11	TRK– (Double axes)	IN
6	GND	IN	12	FCS– (Double axes)	IN

Caution for Handling the Laser Pick-up

The laser pick-up KSS-240A is assembled and precisely adjusted using a sophisticated manufacturing process in our plant. Do not disassemble or attempt to readjust it. Please keep the following instructions carefully in handling pick-up.

1. Handle with Care
(1) Storage
Do not store the pick-up in dusty, high-temperatured or high-humidity environments.
(2) Please take care for preventing from shock by falling down or careless handling.

2. Laser Diode (LD)
(1) Protect your eyes
The laser beam may damage the human eye, since the intensity of the focused spot may reach 7×10^3 W/cm^2 even if the intensity at the objective lens is 400 μW maximum. As the light beam spreads after focused through the objective lens, it does not effect you in the place as far as more than 30 cms. However, do not look at the laser light beam either through the objective lens directly nor another lens or a mirror.
(2) Poison of As
Since the LD chip contains As (Arsenic), as GaAs + GaAlAs, as known as the poison, although the poison is relatively weak, in comparing with others, e.g.As2O3, AsCl3 etc., and the amount is small, avoid putting the chip in acid or an alkali solution, heating it over 200℃ or putting it into your mouth.
(3) Avoid surge current or electrostatic discharge
The LD may be damaged or deteriorated by its own strong light if a large current is supplied to it, even if only a short pulse.
Make sure that there is no surge current in the LD driving circuit by switches or else. Be careful to handle pick-up as it may be damaged in a moment by human electrostatic discharge. The pins of the LD are short-circuited by solder for protection during shipment.
For safety handling of an LD, grounding the human body, measuring equipments and jig is strongly recommended. And still it is further desirable to make use of mat on the platform and floor for handling the LD.
To open the short-circuit, remove the soldering quickly with a soldering iron whose metal part is grounded.
The temperature of the soldering iron should be less than 320℃ (30W).

3. Actuator
(1) The performance of the actuator may be effected if magnetic material is located nearby, since the actuator has a strong magnetic circuit. Do not permit dust to enter through the clearance of the cover.
(2) Cleaning the lens
It may change the specifications by attaching dust or ash on the objective lens. Clean the lens with a cleaning paper dampened with a little water, not pressing lens with so much strength by the cleaning paper.

4. Metal Bearing
As the metal bearing of Cu-compound sintered alloy is impregnated with FROIL946P (*Part No. 529 0054 007), never fail to supply the bushing with the same lubricant at the time of replacing the pick-up.

5. Handling
Please handle the laser pick-up with holding the side base (rosin molded part).
When either a part of human body or some other things may happen to touch directly with the circuit part of P.W.Board, it may cause deterioration, take careful attention in handling this base.

6. Deterioration
As KSS-240 comprises built-in RF Amp and APC curcuit, it resists stronger against external electrostatic damages than the former typed pickup. However, there is possibility of pickup deterioration in the following cases.
(1) Low HF level, or with great numbers of jitters.
(2) Tracking offset (EF Balance) is out of order (Refer to "Confirmation Method of Adjustment " for confirmation on (1) and (2)).

SERVO ADJUSTMENT

NECESSARY EQUIPMENTS FOR ADJUSTMENT

1. Dual trace oscilloscope
2. Reference disc CA1094
3. Frequency Counter
4. Filter for measurement

LOCATION

GU-2751   TP102

VR301   VR302

IC301
IC101   IC201

FRONT
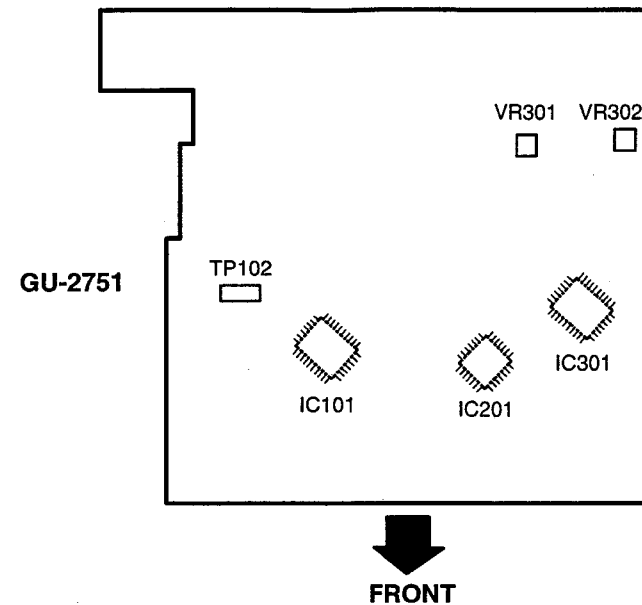
ADJUSTMENT PROCEDURE

Be sure to perform servo confirmations by this order.
1 Actuating the Service Program.
2 Confirmation of Tracking Offset.
3 Confirmation of HF Waveform.

1. ACTUATING THE SERVO PROGRAM

① Turn the power off.
② While simultaneously pushing the SEARCH buttons (◄◄ ►►)
  and the TRACK button (►►I), turn the power on.
③ Displayed indication is version number of microcomputer
 program 4 figures .

Example

$$2842$$

Program Version
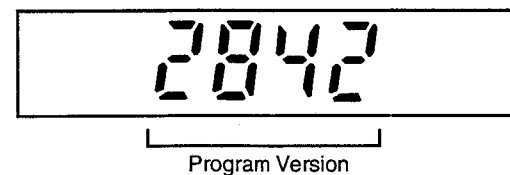
④ Push the TRACK ►►I button of the mechanism intended to
  confirm for one time. After confirm that $0 1$ is displayed, push the
  PLAY button. Then, the Tray will open, set the disc.
⑤ Push the PLAY button. Then, the Tray will close.
⑥ Push the TRACK ►►I button (02 is indicated), then push the
  PLAY button.
⑦ Push the TRACK ►►I button (03 is indicated), then push the
  PLAY button.

2. CONFIRMATION OF TRACKING OFFSET

① Connections

TP102   Oscilloscope
VC ○ 1
TE ○ 2
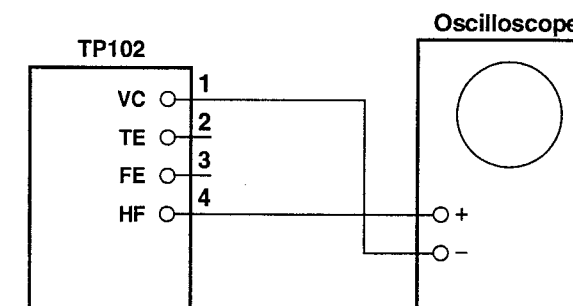FE ○ 3
HF ○ 4
      ○ +
      ○ −
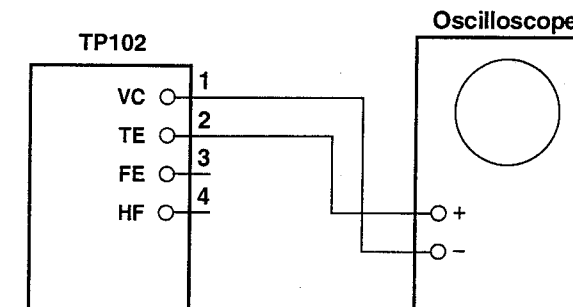
② Push the TRACK ►►I button (04 is indicated), then push the PLAY button.
③ Observe TE on the scope.

0V

A
B
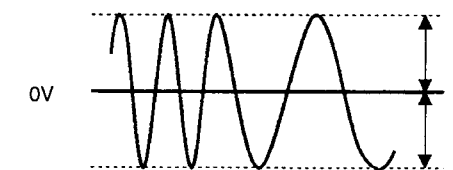
Measure the voltage of A,B and in case $\dfrac{|A-B|}{A+B}$ exceeds 15%, please replace pick-up as it is defected.

3. CONFIRMATION OF HF WAVEFORM

① Connections

TP102   Oscilloscope
VC ○ 1
TE ○ 2
FE ○ 3
HF ○ 4
      ○ +
      ○ −

② Push the TRACK ►►I button (05 is indicated), then push the PLAY button.
③ Observe HF waveform on the scope.
④ The standard amplitude of HF waveform is 1.1V. If it is less than 0.8V, please replace pick-up as it is defected.

4. ADJUSTMENT OF SUPER LINEAR CONVERTER

Adjustment of Super Linear Converter is only performed at a time the DA Converter is replaced.

Adjustment Procedure

① Connections

Connect the LINE OUT to a distortion meter through the low-pass filter.

② Playback a disc obtains 1kHz, 0dB sine wave tone.

③ Adjust the RV301, RV302 and obtain minimum THD.

```
RV301 . . . . . . . . . . . . . . L-channel
RV302 . . . . . . . . . . . . . . R-channel
```

THD standard is less than 0.006%

ABOUT THE SERVICE PROGRAM

The service program is a program specially for servo confirmations.

ACTUATING THE SERVICE PROGRAM.

① Turn the power off.

② While simultaneously pushing the SEARCH buttons (◄◄ ►►) and the TRACK button (►►I), turn the power on.

③ Program version of microcomputer indicated on the remote control signifies start actuating of service program.

CONTENTS OF SERVICE PROGRAM

After actuating the service program, select an aiming process number with the TRACK (I◄◄ ►►I) buttons, END MON button, and PITCH button, and push the PLAY button to execute processing, The process number is then displayed on the TRACK indication portion.

TRACK BUTTONS	Process No. (TRACK Indication)	Function	Contents Explanation
TRACK BUTTONS I◄◄ ►►I	01	OPEN/CLOSE	Performs OPEN/CLOSE each time the PLAY button is pushed.
	02	FOCUS ERROR	Confirm FOCUS Error signal (S curve).
	03	FOCUS SERVO ON	Turns the FOCUS Servo ON.
	04	Confirmation of TRACKING OFFSET	Rotates the disc. Checks divergence of Tracking Offset.
	05	Confirmation of HF	Normally the same as PLAY MODE.
	06	Cleaning of Pick-up Lens	Pick-up. moves when SEARCH (◄◄ ►►)button is pressed. Move the pick-up under the hole of mechanism PWB, and clean the lens.
END MON	0A	CHUCKING Test	Repeats OPEN/CLOSE of tray, servo ON, and TOC read.
PITCH	0d	Heat Run	Repeats, OPEN/CLOSE of tray, repeats playing the first and the last programs of music on the disc. When an error occurs, displays error code and stops. (See the table below.)

Table of Error Code

Error Code	Contents
E0	Automatic adjustment of servo does not finish.
E1	Focus servo error. E1-00 No FOK is appeared. E1-01 FOK is appeared, but no FZC is shown. E1-02 Both FOK, FZC are appeared, but FZC is Shorter than mask time. E1-03 Both FOK, FZC are appeared, but FZC is not turned to "L" within prescribed time.
E2	Unable to detect sync pattern (GFS) however, rotating the disc. E2-00 FOK is turned to "L" after spindle kick. E2-01 GFS is not appeared.
E3	Unable to detect sync pattern (GFS). E3-00 In playing E3-01 in searching.
E4	Unable to read TOC when servo is actuated. E4-00 unable to read subcode. E4-02 Unable to read TOC within 15 seconds after finish reading subcode.
E5	Disc holder malfunction.
E6	Pick-up innermost circle switch does not turn OFF.
E7	Pick-up innermost circle switch does not turn ON.

NOTE FOR PARTS LIST

NOTE FOR PARTS LIST

● Part indicated with the mark " ⊛ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.

● When ordering of part, clearly indicate "1" and "l" (i) to avoid mis-supplying.

● Ordering part without stating its part number can not be supplied.

● Part indicated with the mark "★" is not illustrated in the exploded view.

● Not including Carbon Film ±5%, 1/4W Type in the P.W.Board parts list. (Refer to the Schematic Diagram for those parts.)
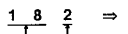
WARNING:

Parts marked with this symbol ⚠ ▨▨▨ have critical characteristics.

Use ONLY replacement parts recommended by the manufacturer.
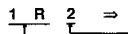
● Resistors

Ex.: RN 14K 2E 182 G FR

RN: Type
14K: Shape and performance
2E: Power
182: Resistance
G: Allowable error
FR: Others

RD : Carbon	2B : 1/8W	F : ±1%	P : Pulse-resistant type
RC : Composition	2E : 1/4W	G : ±2%	NL : Low noise type
RS : Metal oxide film	2H : 1/2W	J : ±5%	NB : Non-burning type
RW : Winding	3A : 1W	K : ±10%	FR : Fuse-resistor
RN : Metal film	3D : 2W	M : ±20%	F : Lead wire forming
RK : Metal mixture	3F : 3W		
	3H : 5W		

* Resistance

```
1  8  2  ⇒  1800 ohm = 1.8 kohm
            Indicates number of zeros after effective number.
            2-digit effective number.
```
• Units: ohm

```
1  R  2  ⇒  1.2 ohm
            1-digit effective number.
            2-digit effective number, decimal point indicated by R.
```
• Units: ohm

● Capacitors

Ex.: CE 04W 1H 2R2 M BP

CE: Type
04W: Shape and performance
1H: Dielectric strength
2R2: Capacity
M: Allowable error
BP: Others

CE : Aluminum foil electrolytic	0J : 6.3V	F : ±1%	HS : High stability type
CA : Aluminum solid electrolytic	1A : 10V	G : ±2%	BP : Non-polar type
CS : Tantalum electrolytic	1C : 16V	J : ±5%	HR : Ripple-resistant type
CQ : Film	1E : 25V	K : ±10%	DL : For charge and discharge
CK : Ceramic	1V : 35V	M : ±20%	HF : For assuring high frequency
CC : Ceramic	1H : 50V	Z : +80%	U : UL part
CP : Oil	2A : 100V	−20%	C : CSA part
CM : Mica	2B : 125V	P : +100%	W : UL-CSA type
CF : Metalized	2C : 160V	−0%	F : Lead wire forming
CH : Metalized	2D : 200V	C : ±0.25pF	
	2E : 250V	D : ±0.5pF	
	2H : 500V	= : Others	
	2J : 630V		

* Capacity (electrolyte only)
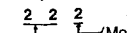
```
2  2  2  ⇒  2200µF
            Indicates number of zeros after effective number.
            2-digit effective number.
```
• Units: µF.
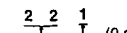
```
2  R  2  ⇒  2.2µF
            1-digit effective number.
            2-digit effective number, decimal point indicated by R.
```
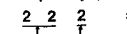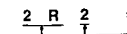• Units: µF.

* Capacity (except electrolyte)

```
2  2  2  ⇒  2200pF = 0.0022µF
            (More than 2)— Indicates number of zeros after effective number.
            2-digit effective number.
```
• Units: µF.

```
2  2  1  ⇒  220pF
            (0 or 1)——— Indicates number of zeros after effective number.
            2-digit effective number.
```
• Units: pF.

• When the dielectric strength is indicated in AC, "AC" is included after the dieelectric strength value.

PRINTED WIRING BOARD PARTS LIST

GU-2751 MAIN P.W.B. UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC101	262 1879 003	IC CXD2515Q	
IC102	263 0909 906	IC BA6392FPT-1	
IC103	263 0910 018	IC BA7042(20MH)	
IC104	262 1205 907	IC TC74HCU04AF	
IC105	263 0615 902	IC BA15218F	
IC106	262 2024 909	IC YSD221F	
IC201	262 2009 005	IC µPD78233GC-3B9	
IC202	262 1721 902	IC TC74HC573AF	
IC203	GEN 2842	ROM Sub Ass'y	
		(included TMS27C256-15)	
IC204	263 0652 907	IC PST529C	
IC205	262 1707 900	IC TC74HC574AF	
IC206	262 1709 908	IC TC74HC245AF	
IC207	262 0945 909	IC SN7438NS-R	
IC208	262 1718 902	IC TC74HC00AF	
IC209	262 1711 909	IC X24C00S	
IC301	262 1474 000	IC µPD6381GF	
IC302	262 1907 001	IC MSM514256B-70ZS	
IC303	262 1765 900	IC SM5841BS	
IC304	262 1805 006	IC PCM-1700L	
IC305	263 0615 902	IC BA15218F	
IC401	263 0935 006	IC SI-3050C	
IC402	263 0800 005	IC NJM78M05FA(S)	
IC403	263 0501 003	IC NJM79M05FA	
IC501	263 0533 000	IC LC7582	
TR201	269 0100 907	Transistor DTA143TS(4.7K)T	Built in Resistor
TR301-304	274 0160 907	Transistor 2SD2144STPU	
TR305	269 0080 904	Transistor DTA114TS(10K)	Built in Resistor
TR306	269 0074 903	Transistor DTC114TS(10K)	Built in Resistor
TR308	269 0100 907	Transistor DTA114TS(4.7K)T	Built in Resistor
TR501-503	269 0082 902	Transistor DTC114EKT96	Built in Resistor
TR504	269 0083 901	Transistor DTA114EKT96	Built in Resistor
D201-216	276 0432 903	Diode 1SS270A TE	
D219	276 0432 903	Diode 1SS270A TE	
D220	276 0432 903	Diode 1SS270A TE	
D301	276 0432 903	Diode 1SS270A TE	
D401	276 0597 000	Diode RBA-402	
D402	276 0405 901	Diode SIWB(A)10	
D403	276 0553 905	Diode 1SR35-200A(T93X)	
D501-504	276 0438 910	Diode MA151A	
LD502	393 9526 908	LED SLR-305VC(RED)	
LD503,504	393 9526 924	LED SLR-305MC(GRN)	
RESISTORS GROUP (not included Carbon Film ±5% 1/4W type)			
VR301,302	211 6093 970	Adjust 100kohm	V06PB104
VR303	211 8006 004	Variable 2kohm	V09V25DA202
VR501	211 0763 015	Variable(Slide)	
R105	247 0009 985	Chip 10kohm, ±5% 1/10 W	RM73B-103JT
R113	247 0007 945	Chip 1kohm, ±5% 1/10 W	RM73B-102JT
R114	247 0012 927	Chip 100kohm, ±5% 1/10 W	RM73B-104JT
R125	247 0012 943	Chip 120kohm, ±5% 1/10 W	RM73B-124JT
R126	247 0010 987	Chip 27kohm, ±5% 1/10 W	RM73B-273JT
R127	247 0011 915	Chip 36kohm, ±5% 1/10 W	RM73B-363JT
R128	247 0008 960	Chip 3.3kohm, ±5% 1/10 W	RM73B-332JT
R129	247 0007 974	Chip 1.3kohm, ±5% 1/10 W	RM73B-132JT
R135	247 0008 960	Chip 3.3kohm, ±5% 1/10 W	RM73B-332JT
R136	247 0005 905	Chip 100ohm, ±5% 1/10 W	RM73B-101JT
R138	247 0009 998	Chip 11kohm, ±5% 1/10 W	RM73B-113JT
R150,151	247 0007 945	Chip 1kohm, ±5% 1/10 W	RM73B-102JT
R152	247 0005 905	Chip 100ohm, ±5% 1/10 W	RM73B-101JT
R201	247 0012 927	Chip 100kohm, ±5% 1/10 W	RM73B-104JT

Ref. No.	Part No.	Part Name	Remarks
R218	247 0009 985	Chip 10kohm, ±5% 1/10 W	RM73B-103JT
R219-223	247 0011 944	Chip 47kohm, ±5% 1/10 W	RM73B-473JT
R261,262	247 0009 985	Chip 10kohm, ±5% 1/10 W	RM73B-103JT
R336,337	247 0004 948	Chip 56ohm, ±5% 1/10 W	RM73B-560JT
R338,339	247 0009 901	Chip 4.7kohm, ±5% 1/10 W	RM73B-472JT
R371,372	247 0009 985	Chip 10kohm, ±5% 1/10 W	RM73B-103JT
R373	247 0007 945	Chip 1kohm, ±5% 1/10 W	RM73B-102JT
R374	247 0018 905	Chip 0ohm, ±10% 1/10 W	RM73B-0R0KT
R375	247 0004 977	Chip 75kohm, ±5% 1/10 W	RM73B-750JT
R398,399	247 0007 945	Chip 1kohm, ±5% 1/10 W	RM73B-102JT
R501	247 0011 957	Chip 51kohm, ±5% 1/10 W	RM73B-513JT
R502	247 0013 942	Chip 330kohm, ±5% 1/10 W	RM73B-334JT
R503,504	247 0003 965	Chip 27ohm, ±5% 1/10 W	RM73B-270JT
R505-507	247 0005 989	Chip 220ohm, ±5% 1/10 W	RM73B-221JT
R508	247 0003 965	Chip 27ohm, ±5% 1/10 W	RM73B-270JT
CAPACITORS GROUP			
C101	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C102	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C106	254 4254 941	Electrolytic 100µF/16V	CE04W1C101MT
C107-109	253 4538 949	Ceramic 100pF/50V	CC45SL1H101JT
C110	254 4260 964	Electrolytic 3.3µF/50V	CE04W13HR3MT
C111	254 4254 909	Electrolytic 10µF/16V	CE04W1C100MT
C112	253 9031 904	Ceramic 0.047µF/25V	CK45=1E473KT
C113	253 4536 970	Ceramic 20pF/50V	CC45SL1H200JT
C114	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C115	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C116	257 0010 900	Ceramic(Chip) 0.01µF/50V	CK73B1H103KT
C117	257 0002 921	Ceramic(Chip) 10pF/50V	CC73SL1H100DT
C118	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C119	253 4538 949	Ceramic 100pF/50V	CC45SL1H101JT
C121	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C122,123	253 4444 907	Ceramic 220pF/50V	CC45SL1H221JT
C124	253 4456 908	Ceramic 680pF/50V	CC45SL1H681JT
C125	257 1013 964	Ceramic(Chip) 0.056µF/25V	CK73B1E563KT
C126	257 0007 942	Ceramic(Chip) 0.0015µF/50V	CC73SL1H152JT
C127	253 4444 907	Ceramic 220pF/50V	CC45SL1H221JT
C128	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C130,131	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C132	257 0001 951	Ceramic(Chip) 3pF/50V	CC73SL1H3R0CT
C133	257 0001 977	Ceramic(Chip) 5pF/50V	CC73SL1H5R0CT
C135	257 0010 900	Ceramic(Chip) 0.01µF/50V	CK73B1H103KT
C141	254 4258 905	Electrolytic 4.7µF/35V	CE04W1V4R7MT
C150	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C180	254 4254 925	Electrolytic 33µF/16V	CE04W1C330MT
C181	253 4538 949	Ceramic 100pF/50V	CC45SL1H101JT
C182	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C201	254 4254 954	Electrolytic 220µF/16V	CE04W1C221MT
C202	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C204	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C230	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C231	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C232	253 9030 992	Ceramic 0.033µF/25V	CK45=1E333KT
C233	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C280	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C303-305	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C307,308	253 4536 983	Ceramic 22pF/50V	CC45SL1H220JT
C309,310	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C311	254 4254 941	Electrolytic 100µF/16V	CE04W1C101MT
C313	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C314	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C316	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C317	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C318,319	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT

Ref. No.	Part No.	Part Name	Remarks
C320	253 4456 908	Ceramic 680pF/50V	CC45SL1H681JT
C321	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C322	253 4456 908	Ceramic 680pF/50V	CC45SL1H681JT
C323-327	253 9030 963	Ceramic 0.01µF/25V	CK45=1E103KT
C328,329	253 4456 908	Ceramic 680pF/50V	CC45SL1H681JT
C330,331	255 1265 907	Film 0.0068µF/50V	CQ93M1H682JT B
C332,333	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C334,335	253 4537 982	Ceramic 56pF/50V	CC45SL1H560JT
C336,337	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C338,339	257 0007 900	Ceramic(Chip) 0.001µF/50V	CC73SL1H102JT
C340	254 4254 954	Electrolytic 220µF/16V	CE04W1C221MT
C341,342	253 1180 921	Ceramic 0.001µF/50V	CK45B1H102KT
C345	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C371	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C382	254 4252 930	Electrolytic 100µF/10V	CE04W1A101MT
C401	254 4254 912	Electrolytic 22µF/16V	CE04W1C220MT
C402	254 4255 717	Electrolytic 4700µF/16V	CE04W1C472MC
C403,404	254 4255 704	Electrolytic 3300µF/16V	CE04W1C332MC
C405,406	254 4254 941	Electrolytic 100µF/16V	CE04W1C101MT
C501	257 0006 969	Ceramic(Chip) 680pF/50V	CC73SL1H681JT
C502	257 2004 901	Tantalum electrolytic 1µF/16V	CS77B1C010MT
C503	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
C800-802	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
C803	257 0014 935	Ceramic(Chip) 0.1µF/25V	CK73F1E104ZT
OTHER PARTS			
X101	399 0036 013	Crystal Resonator (16.9344MHz)	
X201	399 0038 901	Ceramic Resonator (CST12.0MTW-TF1)	
X301	399 0141 005	Ceramic Resonator (CSA24.57MX040)	
LC501	393 4139 002	LCD	
LE501	393 9511 201	LED Back Light	For LC501
RL201	214 0179 006	Relay (EA2-5)	
SW401	212 1039 000	1P Push Switch	
SW501-512	212 4775 905	Tact Switch	
JA101	204 8262 002	1P Pin Jack	
JA301	204 8311 021	2P Pin Jack	
JA302	204 8264 026	Head Phone Jack	
CN2A	205 0581 001	2P VH Connector Base	
CN2B	203 2318 014	2P SAN-SAN Cord	
CN3A	205 0355 033	3P KR Connector Base L	
CN4A	205 0406 047	4P Connector Base(KR-PH)	
CN4B	205 0406 047	4P Connector Base(KR-PH)	
CN5A	205 0343 058	5P Connector Base(KR-PH)	
CN5B	205 0321 054	5P Connector Base(RED)	
CN6A	205 0535 031	6P Connector Base	
CN6B	205 0406 063	6P Connector Base(KR-PH)	
CN12A	205 0683 006	12P FFC Connector Base	
CN17A	205 0736 047	17P FFC Connector Base	
CN17B	205 0702 071	17P FFC Connector Base (L)	
T201	231 8063 009	Pulse Trans	
⚠ T401	233 6122 003	Power Trans	U.S.A. and Canada Model
⚠	233 6121 004	Power Trans	Europe Model
⚠	233 6120 005	Power Trans	Multi-Voltage Model
⚠	205 0825 000	3P AC Connector Base	Multi-Voltage Model only

GU-2767 CN P.W.B. UNIT

Ref. No.	Part No.	Part Name	Remarks
CN6C	205 0536 030	6P Connector Socket	
CN6D	205 0848 906	6P FFC Connector Base	P=0.8

GU-2752 OUTPUT P.W.B. UNIT

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC601,602	263 0360 008	IC NE5532	
D601,602	276 0432 903	Diode 1SS270A TE	
RESISTORS GROUP (not included Carbon Film ±5% 1/4W type)			
VR601,602	211 0552 006	Variable 1k ohm	V09QA102
CAPACITORS GROUP			
C601,602	253 4536 970	Ceramic 20pF/50V	CC45SL1H200JT
C603,604	254 3052 940	Electrolytic 220µF/10V(Bipolar)	CE04D1A221MBPT
C605,606	253 4536 970	Ceramic 20pF/50V	CC45SL1H200JT
C607,608	254 3052 940	Electrolytic 220µF/10V(Bipolar)	CE04D1A221MBPT
C609-613	253 9039 906	Ceramic 0.1µF/25V	CK45=1E104ZT
OTHER PARTS			
RL601,602	214 0179 006	Relay (EA2-5)	
JA601,602	205 0428 009	3P Cannon Connector	
CN601	205 0406 063	6P Connector Base(KR-PH)	

PRINTED WIRING BOARD

GU-2752 OUTPUT UNIT
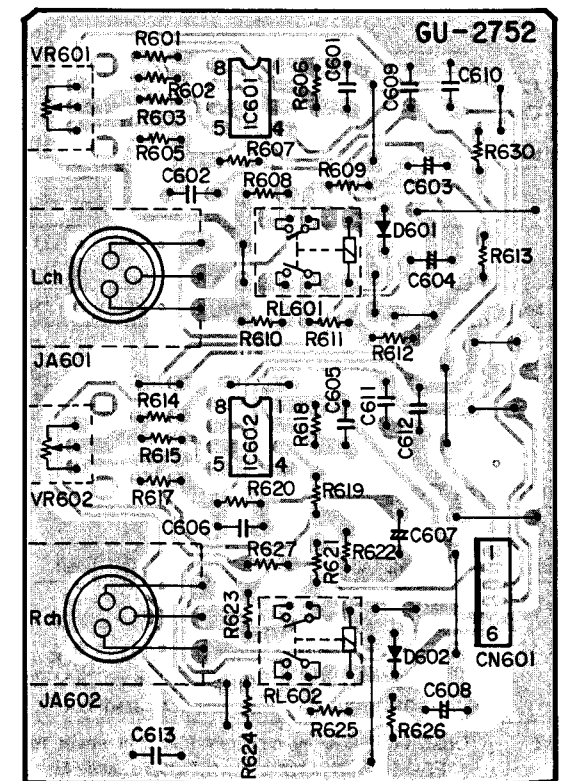
PRINTED WIRING BOARD PATTERNS

GU-2751 MAIN UNIT

GU-2751-4

GU-2751-1

CN3C (Asia Only)

U.S.A. Only

Europe Only

GU-2751-3

GU-2767

GU-2751-2

EXPLODED VIEW OF CHASSIS AND CABINET

Multi voltage model only

Multi voltage model only

WARNING:
Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks	Q'ty
◉ ┌ 1	GU-2751	Main PWB Unit Ass'y		1
├ 1-1		Main PWB Unit		1
│ 1-2		Panel PWB Unit		1
│ 1-3		Switch PWB Unit		1
└ 1-4		Head phone PWB Unit		1
2	204 8311 021	2P Pin Jack		1
3	204 8262 002	1P Pin Jack		1
4	205 0618 110	25P D sub socket	With Screw	1
5	393 9511 201	LED Back Light		1
6	393 4139 002	LCD		1
7	211 0763 015	Slide Volume		1
8	212 4775 905	Tact Switch (Long ST)		12
9	393 9526 908	LED (RED)	SLR-305VC	1
10	393 9526 924	LED (GRN)	SLR-305MC	2
11	212 1039 000	1P Push Switch		1
◉ 12	417 0462 118	Radiator		1
◉ 14	144 2371 118	Front Panel Ass'y		1
◉ 15	146 1371 005	LED Window		3
◉ 16	146 1496 029	Window		1
◉ 17	411 0962 801	Chassis		1
◉ 18	443 0518 003	PCB Holder		1
19	461 0706 114	Foot Sheet		2
20	461 0740 015	Sheet		2
◉ 21	105 1130 106	Back Panel	U.S.A. and Canada Model	1
◉	105 1130 119	Back Panel	Europe Model	1
◉	105 1130 122	Back Panel	Multi-Voltage Model	1
22	337 0030 202	CD MECH. Unit (FG-71)		1
◉ 23	441 1132 204	Bottom Plate		1
◉ 25	GU-2752	Output PWB Unit Ass'y		1
26	211 0552 006	Adjust Resistor (V09QA102)		2
27	205 0428 009	3P Cannon Connector		2
◉ 28	412 3875 008	Head Phone Bracket		1
29	112 0645 182	Head Phone Knob		1
⚠ 30	206 2110 004	AC Cord W/CONN.	U.S.A. and Canada Model	1
⚠	206 2089 106	AC Cord W/CONN.	Europe and Multi-Voltage Model	1
⚠	206 2128 009	AC Cord W/CONN.	U.K. Model	1
⚠ 31	445 0056 008	Cord Bush		1
⚠ 32	233 6122 003	Power Trans	U.S.A. and Canada Model	1
⚠	233 6121 004	Power Trans	Europe and U.K. Model	1
⚠	233 6120 005	Power Trans	Multi-Voltage Model	1
35	119 0081 006	Rubber Button(650)		1
36	119 0072 015	Rubber Button(C)		1
37	113 1357 265	Power SW. Button		1
38	113 1523 015	Slide Knob		1
◉ 39	146 1394 134	Loader Panel		1
40	441 1627 117	P.Button Guide		1
◉ 41	102 0425 224	Top Cover		1
⚠ 42	212 0359 008	Voltage Selector	Multi-Voltage Model only	1
◉ 43	412 3629 102	VOL Selector Bracket	Multi-Voltage Model only	1
44	441 1633 004	P.W.B. Guide		1
45	461 0856 006	Rubber Spacer		1
46	449 0050 006	Card Spacer		1

Ref. No.	Part No.	Part Name	Remarks	Q'ty
SCREWS				
101	473 7002 021	Tapping Screw 3×8(S)	Black	24
102	473 7002 005	Tapping Screw 3×6(S)		12
103	477 0263 018	3P Swelling Screw	Black	4
105	473 7005 002	Tapping Screw 3×10(S)		2
106	473 7508 017	Tapping Screw 3×10(P)		1

● Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
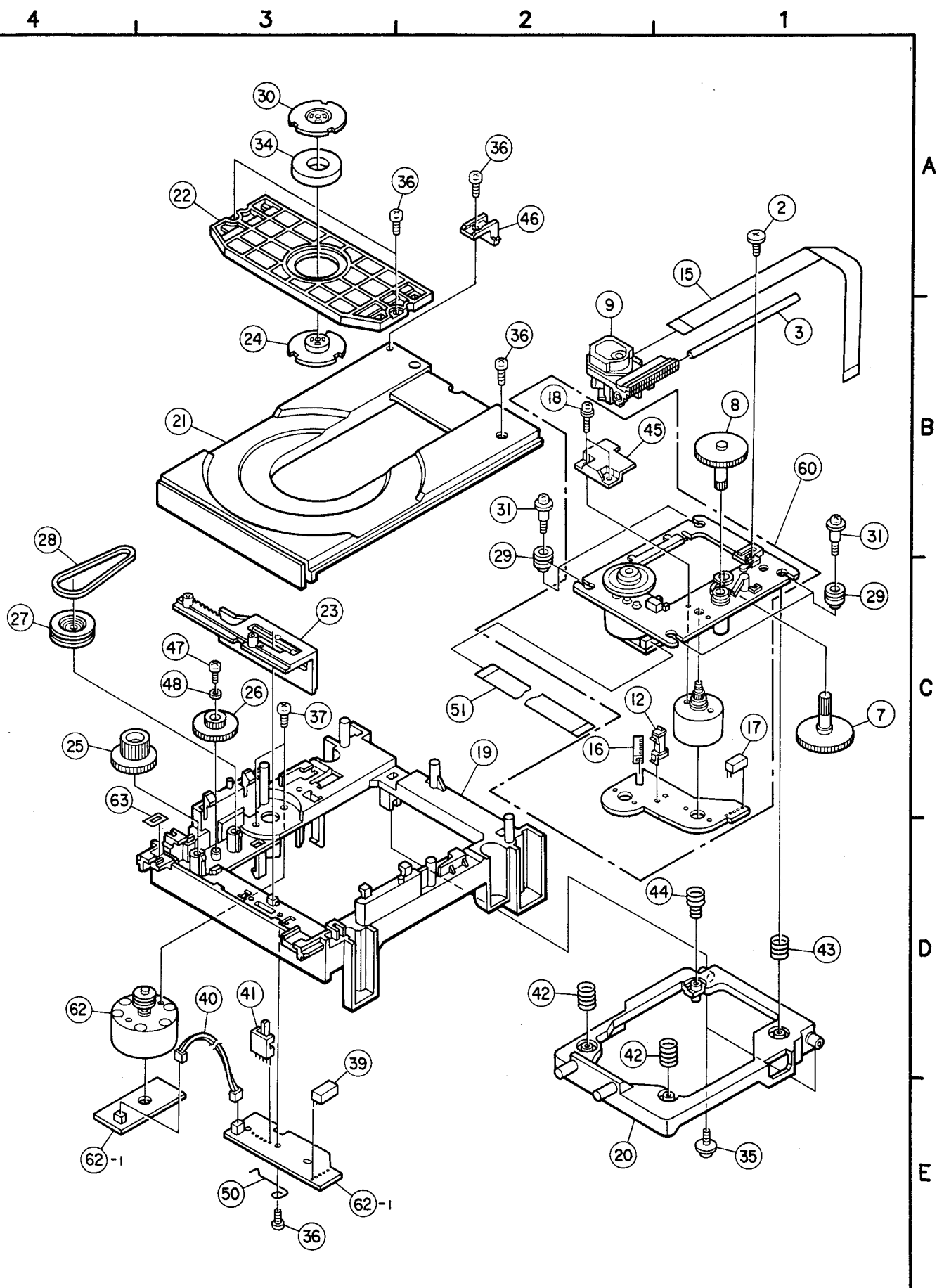
PACKING & ACCESSORIES

Ref. No.	Part No.	Part Name	Remarks	Q'ty
	511 2647 000	INST.Manual		1
	511 2648 009	INST.Manual	Europe Model Only	1
	515 0692 004	DEL Warranty COM.	U.S.A. and Canada Model Only	1
	203 2360 004	2P Pin Cord		1
	504 0092 060	Styrene Paper	For AC Cord	1
	505 0038 030	Poly Cover		1
	202 0042 004	AC Adapter	Multi-Voltage Model Only	1
	503 1130 009	Cushion		2
	501 1739 132	Carton Case		1
	505 0102 092	Styrene Paper		

PARTS LIST OF
FG-71 MECHANISM UNIT

Ref. No.	Part No.	Part Name	Remarks
2	9KA 90H0 06	FS Fixing Screw	
3	9KA 90H0 05	Feed Shaft	
7	9KA 80G0 17	Drive Gear (A)	
8	9KA 80G0 18	Drive Gear (B)	
9	499 0191 009	Laser P.U	KSS-240A
12	9KS 01W1 47	Leaf Switch	
13	—	—	
15	009 0051 001	12P FFC Cable	
16	443 1093 006	FFC Bush	
17	9KA 82G2 53	S5B-PH Connector Base	
18	9KM 20S0 04	2x4 Screw	
19	9KA 85G0 26	MECHA.Plate(FG70)	
20	9KA 85G0 20	MECHA.Frame(FG70)	
21	9KA 85G0 21	CD Tray(FG70)	
22	9KA 85G0 04	Clamper Frame	
23	9KA 85G0 22	UD Plate Gear(FG70)	
24	9KA 85G0 06	Clamper (F)	
25	9KA 85G0 07	Relay Gear(A)	
26	9KA 85G0 08	Relay Gear(B)	
27	9KA 85G0 09	Relay Gear(C)	
28	9KA 85G0 10	Gear Belt(F)	
29	9KA 85G0 30	Damper(FG40)	
30	9KA 85P0 01	Clamper Plate (F)	
31	9KA 85H0 01	Screw(F)	
34	9KA 82G0 57	Magnet	
35	9KA 91H0 02	3x8 (W-10) Screw	
36	9KB 30B0 08	3x8 Baind Screw	
37	9KM 26B0 04	2.6x4 Baind Screw	
39	9KA 82G3 08	S5B-PH(RED)	
40	9KA 85G0 27	CNW2(FG70)	
41	9KS 01W1 48	OP/CL Switch(SSS12)	
42	9KA 85S0 01	Spring (A)	
43	9KA 85S0 02	Spring (B)	
44	9KA 85S0 03	Spring (C)	
45	9KA 85G0 33	Gear Guide	
46	9KA 85G0 36	Tray Stopper	
47	9KB 20B0 05	2x5 Baind (B)	
48	9KS 21W6 04	STW 2.1x6x0.4	
50	9KA 85S0 05	Hold Spring	
60		Spindle Motor Ass'y	
61	—	—	
62	9KA 85A0 06	Loading Motor Ass'y	
62-1	9KA 85P0 05	Motor P.W.B.	
63	9KA 85P0 18	Spacer 72	

EXPLODED VIEW OF FG-71 MECHANISM UNIT

WIRING DIAGRAM

1 2 3 4

A

PHONES

LINE OUT

BALANCE
L R

UNBALANCE
L R

DIGITAL OUT
COAXIAL

REMOTE

13 25 12 24 11 23 10 22 9 21 8 20 7 19 6 18 5 17 4 16 3 15 2 14 1

CN25

H/P PWB
GU-2751-4

OUTPUT PWB
GU-2752

B

CN4B
1 2 3 4

CN6E
1 2 3 4 5 6

CN4A
1 2 3 4

CN6B
1 2 3 4 5 6

CN17A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

CN17B
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

DISPLAY PWB
GU-2751-2

CN3A
1 2 3

MAIN PWB
GU-2751-1

POWER SW PWB
GU-2751-3

CN3B
1 2 3

C

CN6A
1 2 3 4 5 6

CN6C
1 2 3 4 5 6

CN PWB
GU-2767

VOLTAGE SELECTOR

CN3C
3 2 1

MULTI-VOLTAGE MODEL ONLY

D

CN6D
1 2 3 4 5 6

CN5A
1 2 3 4 5

CN5B
1 2 3 4 5

CN12A
1 2 3 4 5 6 7 8 9 10 11 12

CB2A
1 2

AC

1 2 3 4 5 6

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5 6 7 8 9 10 11 12

SPINDLE MOTOR

SLIDE MOTOR
M

IN SW

LOADER MOTOR
M

OPEN/CLOSE SW

KSS240A
OPTICAL PICK UP

E

FG71
MECHA UNIT

SEMICONDUCTORS

● IC's

μPD78233GC-3B9(IC201)

YSD221F (IC106)
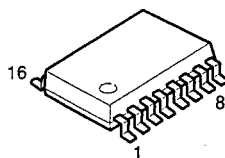
BA6392FP-T1(IC102)
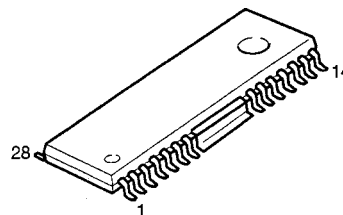
μPD6381GF(IC301)
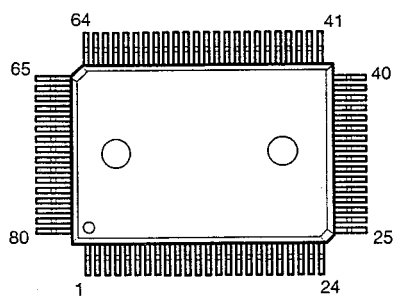
SN7438NS (IC207)
HD74HC00FP (IC208)
TC74HCU04FP (iC104)

HD74HC00FP
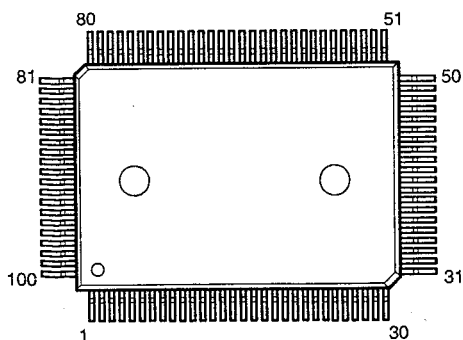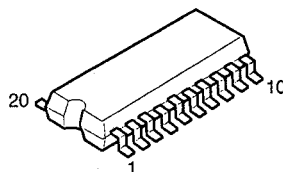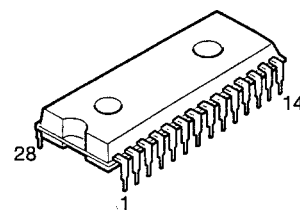SN7438NS

1A	1		14	Vcc
1B	2		13	4B
1Y	3		12	4A
2A	4		11	4Y
2B	5		10	3B
2Y	6		9	3A
GND	7		8	3Y

TC74HCU04FP

1A	1		14	Vcc
1Y	2		13	6A
2A	3		12	6Y
2Y	4		11	5A
3A	5		10	5Y
3Y	6		9	4A
GND	7		8	4Y
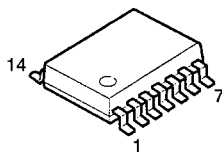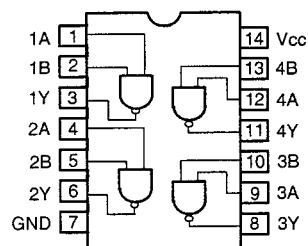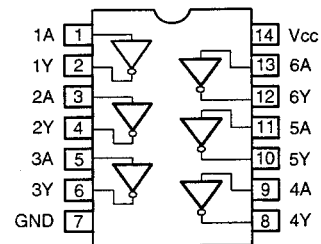
CXD2515Q(IC101)
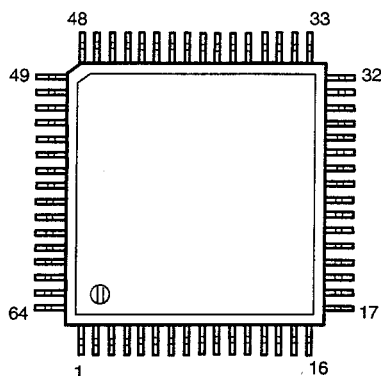
TC74HC573AF(IC202)
TC74HC574AF(IC205)
HD74HC245FP(IC206)

TMS27C256-15(IC203)
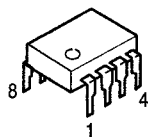PCM-1700L(IC304)

SM5841BS(IC303)
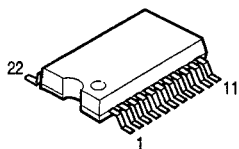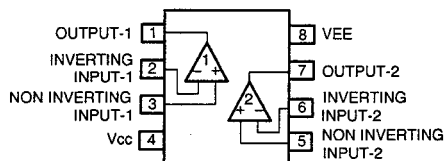
LC7582(IC501)

MSM514256B-70ZS (IC302)
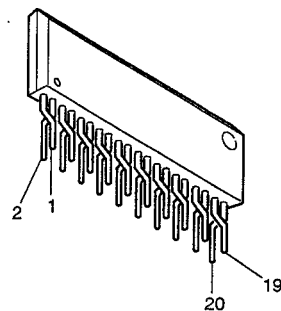
BA15218F(IC105,305)
X24C00 (IC209)
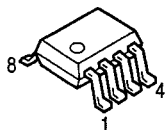
BA7042(IC103)
NE5532 (IC601,602)

BA15218F
NE5532

OUTPUT-1 [1]   [8] VEE
INVERTING INPUT-1 [2]   [7] OUTPUT-2
NON INVERTING INPUT-1 [3]   [6] INVERTING INPUT-2
Vcc [4]   [5] NON INVERTING INPUT-2

PST529C(IC204)

OUT
GND
Vcc
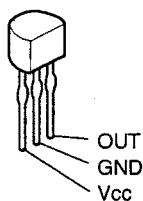
SI3050C (IC401)
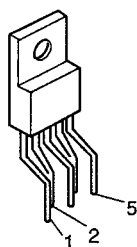
1.ADJUST
2.ON/OFF
3.GND
4.Vin
5.Vout

NJM78M05FA (IC402)

OUT
GND
IN

NJM79M05FA (IC403)

OUT
IN
GND
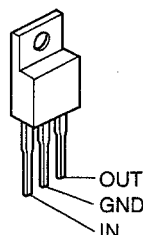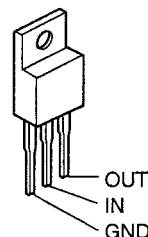
LCD(LC501)

Segment

Common

ELAPSE REMAIN
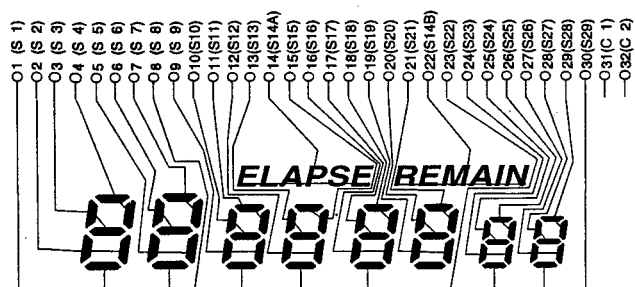
ELAPSE REMAIN
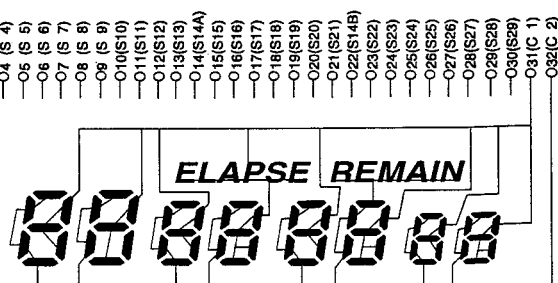
● TRANSISTORS

2SD2144STPU (TR301~304)

— B (Base)
— C (Collector)
— E (Emitter)
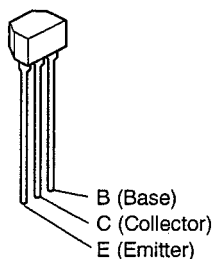
DTA114TS (TR305)
DTA143TS (TR201)
DTC114TS (TR306)

— B (Base)
— C (Collector)
— E (Emitter)

DTA TS Series

B o—R1—W

	R1
DTA114TS	10k
DTA143TS	4.7k

DTC 114 TS

B o—R1—W 10k
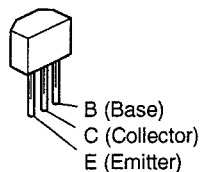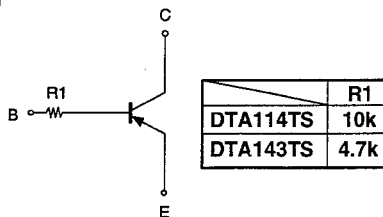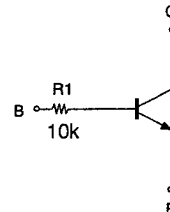
DTA114EK (TR504)

1: GND/Emitter
2: In/Base
3: Out/Collector

R1 B—W (2) 10k
R2 10k E (1)
C (3)
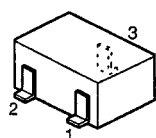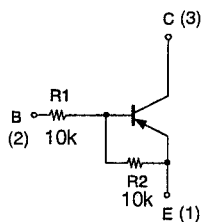
DTC114EK (TR501~503)

1: GND/Emitter
2: In/Base
3: Out/Collector

R1 B o—W (2) 10k
R2 10k E (1)
C (3)
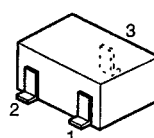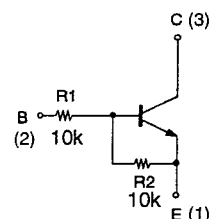
● DIODES

MA151A(D501~503)
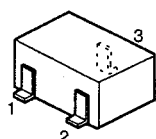
1: Cathode
2: NC
3: Anode

RBA402(D401)

3~ ⊕1 ⊖4 2~

1SS270ATE (D203~223,301)

1SR35-200A (D403)

Blue
Orange

S1WB(A)10(D402)

1 ~ — 4
2 ~ + 3
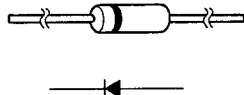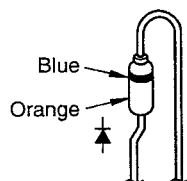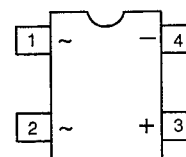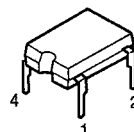
● LED

BACKLIGHT(LE501)

Cathode Anode
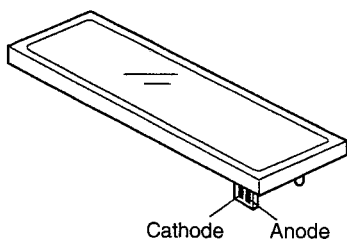
SLR-305VC(RED)(LE502)
SLR-305MC(GRN)(LE503,504)

Anode Cathode

23
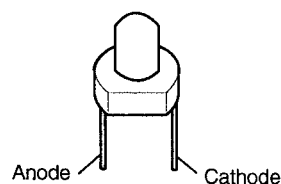
IC TERMINAL FUNCTION LIST

TABLE OF MICROCOMPUTER μPD78233GC-3B9 (IC201) TERMINALS

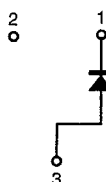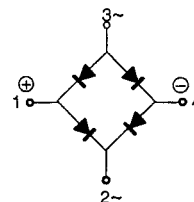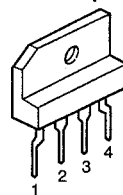| Terminal No.	Symbol Name	I/O	Terminal Function
1	SCL	O	Serial communication enable signal for connected RC-35. Data read/write clock for X24C00 (IC209).
2	RST2	O	Reset signal of IC301 (μPD6381GF).
3	LED0	O	LED/KEY scan matrix signal 1.
4	LED1	O	LED/KEY scan matrix signal 2.
5	LED2	O	LED/KEY scan matrix signal 3.
6	SDA	I/O	Communication reserved signal or busy signal for CD1. Read/write data of IC209.
7	RST–	I	Hard reset input. Reset at "L".
8	V_{DD}	—	+5V power supply.
9	X2	I	Clock oscillation circuit input 2.
10	X1	I	Clock oscillation circuit input 1.
11	V_{SS}	—	0V power supply.
12	CLCK	O	Clock for servo command, level command. Connected to IC101 (CXD2515), 303 (SM5841BS).
13	DATA	O	Data for servo command, level command. Connected to IC101 (CXD2515), 303 (SM5841BS).
14	XLAT	O	Latch pulse of servo command. Latched at falling edge.
15	SCLK	—	Clock for data reading from IC101 (CXD2515).
16	LDON	O	Laser ON/OFF signal of optical pickup. Lase emits light at "H".
17	LCLK	O	Command transmitting clock for LCD driver.
18	LDAT	O	Command data for LCD driver.
19	LCE	O	Chip enable signal for LCD driver.
20	SRST–	O	Reset signal of IC101 (CXD2515).
21	—	O	Not Used.
22	RE–	O	Enable signal output for external ROM. Mask item... fixed to "L", external ROM... pulse output for writing.
23	OE–	O	Enable signal output for external ROM. Mask item... fixed to "L", external ROM... pulse output for reading.
24	CS–	O	Chip select signal of IC301. Normally "H". "L" at select only.
25	C–/D	O	Command data designate signal of IC301. Command at "L", indicates data transmitting mode at "H".
26	SCK–	O	Clock for command transmission to IC301.
27	SI	O	Command data to IC301.
28	A15	O	Memory address 15. Not used. Mask item... fixed to "L".
29	A14	O	Memory address 14. Mask item... fixed to "L".
30	A13	O	Memory address 13. Mask item... fixed to "L".
31	A12	O	Memory address 12. Mask item... fixed to "L".
32	A11	O	Memory address 11. Mask item... fixed to "L".
33	A10	O	Memory address 10. Mask item... fixed to "L".
34	A9	O	Memory address 9. Mask item... fixed to "L".
35	A8	O	Memory address 8. Mask item... fixed to "L".
36	AD7	I/O	Data bus 7. Mask item... fixed to "L".
37	AD6	I/O	Data bus 6. Mask item... fixed to "L".
38	AD5	I/O	Data bus 5. Mask item... fixed to "L".
39	AD4	I/O	Data bus 4. Mask item... fixed to "L".
40	AD3	I/O	Data bus 3. Mask item... fixed to "L".
41	AD2	I/O	Data bus 2. Mask item... fixed to "L".
42	AD1	I/O	Data bus 1. Mask item... fixed to "L".
43	AD0	I/O	Data bus 0. Mask item... fixed to "L".
44	ASTB	O	Pulse for address latch. Mask item... fixed to "L".
45	V_{SS}	—	0V power supply.
46	MODE	I	Memory mode selection terminal. Use external ROM at "H", use mask ROM at "L". Mask item... "L", external ROM "H".
47	AMUTE	O	Audio output mute signal. Mute at "H".
48	SQCK	O	Clock for sub-code reading.

Terminal No.	Symbol Name	I/O	Terminal Function
49	SENS	I	Indication signal of servo actuating condition. Emits from IC101.
50	CLOSE–	I	Tray CLOSE switch. CLOSE state at "L".
51	OPEN	I	Tray OPEN switch. OPEN state at "L".
52	SQSO	I	Sub-code data input. Emits from IC101.
53	DFLAT	O	Command latch pulse for digital filter. Ouptut to IC303.
54	CLD	O	Serial communication enable signal for connected DN-1000F.
55	V$_{DD}$	—	+5V power supply.
56	CDNO	O	Machanism number input. Mechanism 1 at "L". Mechanism 2 at "H".
57	—	I	Not used. Fixed to "L".
58	—	I	Not used. Fixed to "L".
59	PITCH	I	Pitch volume input.
60	PMODE	I	Mode input for player.
61	SO	I	Serial communication input to IC301. (Normally "H")
62	—	I	Not used. Fixed to "L".
63	FOK	I	Input terminal.
64	AV$_{DD}$	—	+5V power supply for A/D converter.
65	AVREF1	—	+5V. A/D converter reference voltage.
66	AV$_{SS}$	—	0V power supply for A/D converter.
67	LOADER	O	Tray drive signal. Stops at 2.5V. CLOSE action at 3V. OPEN action at 2V.
68	—	O	Not used.
69	AVREF2	—	+5V. D/A converter reference voltage.
70	AVREF3	—	0V. D/A converter reference voltage.
71	KIN0	I	Key data 0.
72	KIN1	I	Key data 1.
73	KIN2	I	Key data 2.
74	KIN3	I	Key data 3.
75	KIN4	I	Key data 4.
76	RST	I	Input for +5V voltage observation. Shifts to "H" when POWER switch is turned off.
77	SCOR	I	Sub code sink input. Connect to IC101. Input 75 pulses per 1 second.
78	REMOT	I	Infrared-ray remote control signal input.
79	RXD–	I	Serial interface reception data.
80	TXD–	O	Serial interface transmission data.

TABLE OF DIGITAL SIGNAL PROCESSOR μPD6381GF (IC301) TERMINALS

Terminal No.	Symbol Name	I/O	Terminal Function
1	DRDY	O	Command reception READY signal from microcomputer. Normally "H".
2	FSMASK	I	LRCK mask signal. Fixed to "L".
3	SEL	I	Clock input select. Fixed to "H".
4	—	I	Not used.
5	XO	O	X'tal oscillation output.
6	XI	I	X'tal oscillation input.
7	GND	—	0V power supply.
8	XFSO	O	Clock Output. Not used.
9	—	—	Not connected.
10	LRCKO	O	LR clock output. 44.1kHz.
11	WCLKO	O	Word clock output. 88.2kHz. Not used.
12	BCLKO	O	Bit clock output. 2.1MHz.
13	BRAK–	O	Break acknowledge output. Fixed to "H".
14	GND	—	0V power supply.
15	BRRQ–	I	Break request input. Fixed to "H".
16	FSRST–	I	Program counter reset input. Fixed to "H".
17	RST2–	I	Soft reset input. Normally "H".
18	RST–	I	Hard reset input. Normally "H".
19	A0	O	External RAM address 0.
20	A1	O	External RAM address 1.
21	A2	O	External RAM address 2.
22	A3	O	External RAM address 3.
23	A4	O	External RAM address 4.
24	A5	O	External RAM address 5.
25	A6	O	External RAM address 6.
26	A7	O	External RAM address 7.
27	A8	O	External RAM address 8.
28	A9	O	External RAM address 9. Not used.
29	A10	O	External RAM address 10. Not used.
30	A11	O	External RAM address 11. Not used.
31	A12	O	External RAM address 12. Not used.
32	A13	O	External RAM address 13. Not used.
33	V_{DD}	—	+5V power supply.
34	A14	O	External RAM address 14. Not used.
35	A15	O	External RAM address 15. Not used.
36	A16	O	External RAM address 16. Not used.
37	RAS–	O	External RAM low address strobe signal.
38	CAS–	O	External RAM column address strobe signal.
39	WE–	O	External RAM write enable signal.
40	I01	I/O	External RAM data 1.
41	I02	I/O	External RAM data 2.
42	I03	I/O	External RAM data 3.
43	I04	I/O	External RAM data 4.
44	I05	I/O	External RAM data 5. Not used.
45	I06	I/O	External RAM data 6. Not used.
46	I07	I/O	External RAM data 7. Not used.
47	I08	I/O	External RAM data 8. Not used.
48	I09	I/O	External RAM data 9. Not used.

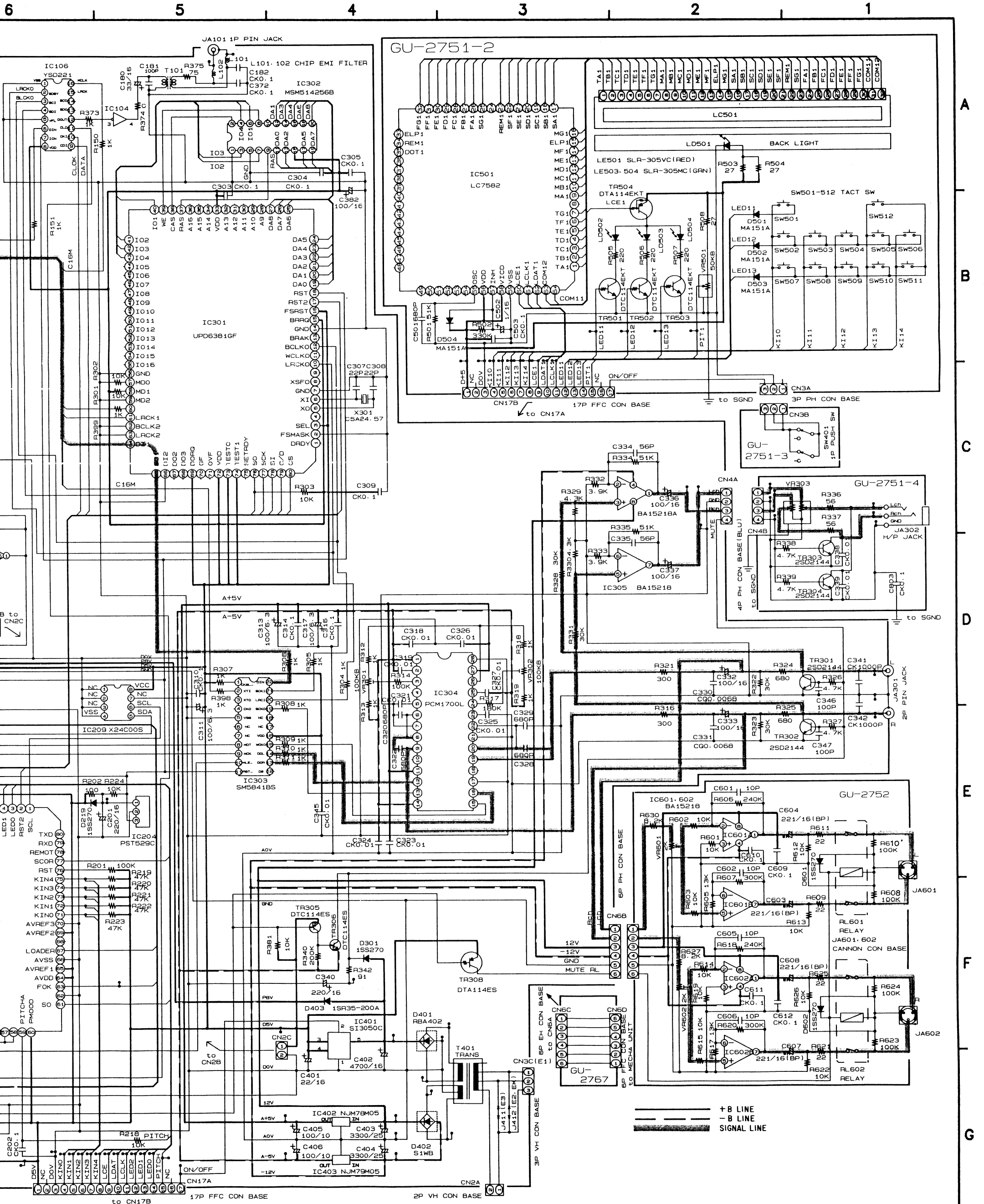| Terminal No.	Symbol Name	I/O	Terminal Function
49	I010	I/O	External RAM data 10. Not used.
50	I011	I/O	External RAM data 11. Not used.
51	I012	I/O	External RAM data 12. Not used.
52	I013	I/O	External RAM data 13. Not used.
53	I014	I/O	External RAM data 14. Not used.
54	I015	I/O	External RAM data 15. Not used.
55	I016	I/O	External RAM data 16. Not used.
56	GND	—	0V power supply.
57	MD0	I	Mode select 0. Fixed to "L".
58	MD1	I	Mode select 1. Fixed to "H".
59	MD2	I	Mode select 2. Fixed to "L".
60	BCLK1	I	Bit clock input. 2.18MHz.
61	LRCK1	I	LR clock input. 44.1kHz.
62	BCLK2	I	Fixed to "L". Not used.
63	LRCK2	I	Fixed to "L". NOt used.
64	DI1	I	Data input.
65	DO1	O	Data output.
66	DI2	I	Fixed to "L". Not used.
67	DO2	O	Not used.
68	DO3	O	Not used.
69	DORQ–	I	Not used. Fixed to "H".
70	GF–	O	G flag output. Normally "H".
71	OVF–	O	Over flag output. Normally "H".
72	V_{DD}	—	+5V power supply.
73	TEST0	I	Fixed to "H".
74	TEST1	I	Fixed to "H".
75	SETRDY	O	Not used.
76	SO	O	Serial data output.
77	SCK–	I	Serial data input/output clock.
78	SI	I	Serial data input.
79	C–/D	I	Command /data designation signal. "L" - command, "H" - data.
80	CS–	I	Chip select input.

CXD2515Q (IC101) TERMINAL FUNCTION

Terminal No.	Symbol Name	I/O	Terminal Function
1	SRON	O	Sled drive output.
2	SRDR	O	Sled drive output.
3	SFON	O	Sled drive output.
4	TFDR	O	Tracking drive output.
5	TRON	O	Tracking drive output.
6	TRDR	O	Tracking drive output.
7	TFON	O	Tracking drive output.
8	FFDR	O	Focus drive output.
9	FRON	O	Focus drive output.
10	FRDR	O	Focus drive output.
11	FFON	O	Focus drive output.
12	VCOO	O	Oscillation circuit output for analog EFM PLL.
13	VCOI	I	Oscillation circuit input for analog EFM PLL. fLOCK=8.6436MHz.
14	TEST	I	Test terminal, normally GND.
15	V_{SS}	—	Digital GND.
16	TES2	I	Test terminal, normally GND.
17	TES3	I	Test terminal, normally GND.
18	PDO	O	Charge pump output for analog EFM PLL.
19	VPCO	O	PLL charge pump output for variable pitch.
20	VCKI	I	Clock input from external VCO for variable pitch. fCENTER=16.9344MHz.
21	AV_{DD}	—	Analog power supply.
22	IGEN	I	Current source reference resistor connecting terminal for OP amplifier.
23	AV_{SS}	—	Analog GND.
24	ADII	I	A/D converter input terminal.
25	ADIO	O	OP amplifier output terminal.
26	RFDC	I	RF signal input. Input range 2.15–5.0V (at V_{DD}=AV_{DD}=5.0V).
27	TE	I	Tracking error signal input. Input range 2.5V±1.0V (at V_{DD}=AV_{DD}=5.0V).
28	SE	I	Sled error signal input. Input range 2.5V±1.0V (at V_{DD}=AV_{DD}=5.0V).
29	FE	I	Focus error signal input. Input range 2.5V±1.0V (at V_{DD}=AV_{DD}=5.0V).
30	VC	I	Mid-point voltage input terminal.
31	FILO	O	Filter output for master PLL.
32	FILI	I	Filter input for master PLL.
33	PCO	O	Charge pump output for master PLL.
34	CLTV	I	VCO control voltage input for master.
35	AV_{SS}	—	Analog GND.
36	RFAC	I	EFM signal input.
37	BIAS	I	Asymmetry circuit constant current input.
38	ASYI	I	Asymmetry compare voltage input.
39	ASYO	O	EFM full swing output. (L=V_{SS}, H=V_{DD}).
40	AV_{DD}	—	Analog power supply.
41	V_{DD}	—	Digital power supply.
42	ASYE	I	Asymmetry circuit ON/OFF (L=OFF, H=ON).
43	PSSL	I	Audio data output mode shifting input. L to serial output, H to parallel output.
44	WDCK	O	48-bit slot D/A interface. Word clock f=2Fs.
45	LRCK	O	48-bit slot D/A interface. LR clock f=Fs.
46	DA16	O	DA16 output at PSSL=1. Serial data of 48-bit slot at PSSL=0.
47	DA15	O	DA15 output at PSSL=1. Bit clock of 48-bit slot at PSSL=0.
48	DA14	O	DA14 output at PSSL=1. Serial data of 64-bit slot at PSSL=0.

Terminal No.	Symbol Name	I/O	Terminal Function
49	DA13	O	DA13 output at PSSL=1. Bit clock of 64-bit slot at PSSL=0.
50	DA12	O	DA12 output at PSSL=1. LR clock of 64-bit slot at PSSL=0.
51	DA11	O	DA11 output at PSSL=1. GTOP output at PSSL=0.
52	DA10	O	DA10 output at PSSL=1. XUGF output at PSSL=0.
53	DA09	O	DA09 output at PSSL=1. XPLCK output at PSSL=0.
54	DA08	O	DA08 output at PSSL=1. GFS output at PSSL=0.
55	DA07	O	DA07 output at PSSL=1. RFCK output at PSSL=0.
56	DA06	O	DA06 output at PSSL=1. C2PO output at PSSL=0.
57	DA05	O	DA05 output at PSSL=1. XRAOF output at PSSL=0.
58	DA04	O	DA04 output at PSSL=1. MNT3 output at PSSL=0.
59	DA03	O	DA03 output at PSSL=1. MNT2 output at PSSL=0.
60	DA02	O	DA02 output at PSSL=1. MNT1 output at PSSL=0.
61	DA01	O	DA01 output at PSSL=1. MNT0 output at PSSL=0.
62	XTAI	I	X'tal oscillation circuit input. 16.9344MHz or 33.8688MHz input.
63	XTAO	O	X'tal oscillation circuit output.
64	XTSL	I	X'tal selection input terminal. L at X'tal for 16.9344MHz, at 33.8688MHz turns to H.
65	Vss	—	Digital GND.
66	FSTI	I	2/3 divided input of terminals 62 and 63.
67	FSTO	O	2/3 divided input of terminals 62 and 63. Unvarying by variable pitch.
68	C4M	O	4.2366MHz output. Simultaneously varies when variable pitched.
69	C16M	O	16.9344MHz output. Simultaneously varies when variable pitched.
70	MD2	I	Digital-out ON/OFF control terminal (L=OFF, H=ON).
71	DOUT	O	Digital-out output terminal.
72	EMPH	O	Emphasis mode output of playback disc (L at without emphasis, H at emphasized).
73	WFCK	O	WFCK output.
74	SCOR	O	Subcode sync output terminal (H at detecting either one of SO or SI subcode sync).
75	SBSO	O	Serial output of sub P~W.
76	EXCK	I	Clock input for SBSO read out.
77	SQSO	O	SubQ 80-bit output. PCM peak data, level data 16-bit output.
78	SQCK	I	Clock input for SQSO read out.
79	MUTE	I	Mute shifting terminal (H to mute).
80	SENS	O	SENS output. Outputs to CPU.
81	XRST	I	System reset (L to reset).
82	DIRC	I	Used for at I-track jump.
83	SCLK	I	Clock for SENS serial data reading.
84	DFSW	I	DFCT shifting terminal (H to DFCT countermeasure circuit OFF).
85	ATSK	I	Anti-shock terminal.
86	DATA	I	Serial data input from CPU.
87	XLAT	I	Latch input from CPU.
88	CLOK	I	Serial data transfer clock input from CPU.
89	COUT	O	Number of track count signal output.
90	VDD	—	Digital power supply.
91	MIRR	O	Mirror signal output.
92	DFCT	O	Defect signal output.
93	FOK	O	Focus OK output.
94	FSW	O	Output filter shifting output of spindle motor.
95	MON	O	ON/OFF control output of spindle motor.
96	MDP	O	Servo control of spindle motor.
97	MDS	O	Servo control of spindle motor.
98	LOCK	O	Sampling GFS with 460Hz and outputs H at GFS is H. Outputs L when continuously 8 times L.
99	SSTP	I	Terminal for inner most circle detection signal of disc.
100	SFDR	O	Sled drive output.

Note: ● 64-bit slot is 2's compliment output of LSB first, 48-bit slot is 2's compliment output of MSB first.
● GTOP is to monitor the protection condition of Frame Sync. (H: Sync protect window open.)
● XUGF is Frame Sync obtained from EFM signal and is negative pulse.
● XPLCK is reversal of EFM PLL clock. PLL is so made the rising edge to meet shifting point of EFM signal.
● GFS signal is a signal to turn to H when frame Sync and inserted protection timing coincide.
● RFCK is obtained with the accuracy of X'tal. The signal of 136µs cycle.
● C2PO is a signal to indicate the state of data error.
● XRAOF is a generating signal when 32kRAM exceeds ±28 frame jitter margin.

11   10   9   8   7   6

GU-2751-1

TP101
5P PH CON BASE

TP102
4P PH CON BASE

to MECHA UNIT
CN12A 12P FFC CON BASE

IC106
YSD221

X101
X'TAL(16.9344MHz)
C132 3P
C133 5P

IC101
CXD2515Q

CN5B
5P PH CON BASE
to MECHA UNIT
OPEN-
GND
CLOSE-
LOADER+
LOADER-

CN5A
5P PH CON BASE
to MECHA UNIT
NC
GND
InSw
SLIDE+
SLIDE-

CN6A
6P CON BASE
to CN6C
HSV
DSV
ECR
tL
VC
GND

IC104
IC105
BA15218

IC104 HCU04

X201 CST12.0M

IC208
HC00

D201-216   R230-237
1SS270   10K

PLAYC
PAUC
STBC
TR+
TR-
FWD
REV
FSTRT

IC206
HC245

IC205
HC574

IC203
27C256

IC202
HC573

IC201
UPD78233GC-3B9

CN25

250 DSUB BASE

IC207
7438

RL201 RELAY
TR201
DTA143TS

R240   C232
120   CKO.033

C230
CKO.1

to SGND

C802 DOV
CKO.1

C800
CKO.1

C204
CKO.1

C202
CKO.1

to SGND